



NetWorker™

Module for Microsoft® Exchange Server

Release 4.1

Administrator's Guide

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Preface

This guide provides information on how to configure and manage the LEGATO NetWorker[®] Module for Microsoft[®] Exchange Server, Release 4.1 software.

Install the NetWorker[™] Module software on the appropriate server and clients before using the information presented in this guide. For installation instructions, refer to the *NetWorker Module for Microsoft Exchange Server, Release 4.1, Installation Guide*.

Post-release information is contained in the Release Supplement for this product. This document is available at www.legato.com. Refer to the web site periodically to view the latest Release Supplement.

Audience


The information in this guide is intended for administrators and others responsible for data management on Exchange servers. This guide assumes a working knowledge of Microsoft Exchange Server and the LEGATO NetWorker client and server software.

Product Documentation

For a complete list of documentation related to this product, see "[Related Documentation](#)" on page 35. Most of the documents are Adobe Acrobat PDFs, and can be viewed by downloading and installing the Adobe Acrobat Reader. The Reader is available in the `/viewers/acroread` directory on the LEGATO[®] Documentation Suite CD-ROM, or directly from Adobe. To install and use the Reader on the preferred platform, refer to the instructions in the CD-ROM's `/viewers/acroread/readme.txt` file or at the Adobe web site.

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Convention	Indicates	Example
boldface	Names of line commands, daemons, options, programs, or scripts	The nsradmin command starts the command line version of the NetWorker Administrator program.
<i>italic in text</i>	Pathnames, filenames, computer names, new terms defined in the Glossary or within the chapter, or emphasized words	Displayed messages are also written to <i>/nsr/logs/daemon.log</i> . The specifications are created, one for each swap file, in <i>c:\pagefile.sys</i> .
<i>italic in command line</i>	A variable that must be provided in the command line	nwadmin -s <i>server_name</i>
fixed-width	Examples and information displayed on the screen	media waiting: recover waiting for 8mm 5GB tape volume name
fixed-width, boldface	Commands and options that must be entered exactly as shown	nsr_shutdown -a
Menu_Name> Command	A path or an order to follow for making selections in the user interface	Volume>Change Mode>Appendable
Important:	Information that must be read and followed to ensure successful backup and recovery of data	 <hr/> Important: Use the no_verify option with extreme caution.

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- To provide other suggestions and comments, send e-mail to feedback@legato.com. Although LEGATO cannot respond personally to every request, all comments and suggestions are considered during product design.

Chapter 1: NetWorker Module Overview

This chapter provides general and conceptual information about how the NetWorker Module for Exchange Server backs up and recovers Microsoft Exchange data. It includes the following sections:

- ["About the NetWorker Module" on page 17](#)
- ["NetWorker Module Interoperability" on page 19](#)
- ["Backup Operations" on page 23](#)
- ["Recovery Operations" on page 31](#)
- ["Related Documentation" on page 35](#)

About the NetWorker Module

The NetWorker Module for Exchange Server provides services that enable the NetWorker software to back up and recover *Microsoft Exchange Server objects*, while the Exchange server is online. The NetWorker Module integrates this capability into the centralized data protection solution NetWorker software provides for distributed, *heterogeneous* enterprise networks.

Without regular backups, you risk losing data. Like other computer data, Exchange data can be lost due to hardware failures, software problems, or operator errors. If the Exchange transaction logs are lost, data can be recovered only to the time of the last full backup. Without a full backup, and logs of the subsequent transactions, Exchange data cannot be recovered. A backup strategy and disaster recovery plan can help you recover Exchange data that becomes lost or unavailable.

Traditional Versus Snapshot Operations

This NetWorker Module supports NetWorker PowerSnap™ Module software, which provides enhanced data protection through *snapshot* technology.

PowerSnap Modules provide an interface between a snapshot-capable storage subsystem and the NetWorker and NetWorker Module software. The interface enables you to create and manage *point-in-time* (PIT) copies, or snapshots, of Microsoft Exchange 2000 Server and Exchange Server 2003 data.

Once you have installed and configured the appropriate PowerSnap Module for the Exchange server's primary storage subsystem, you can perform snapshot backup and recovery operations, in addition to using the NetWorker Module's *traditional backup* and recovery capabilities.

Note: For the most comprehensive data protection, develop a backup strategy that uses a combination of snapshot and traditional backups.

NetWorker Module Features

This NetWorker Module provides the following features:

- Traditional backup and recovery of the following:
 - Entire Information Store (IS).
 - Individual or multiple storage groups or databases.

Note: Although it is possible to back up individual databases, it is not recommended. For more information, see "[Backup Recommendations](#)" on page 73.
 - Individual or multiple private mailboxes.
 - All or individual items in private mailboxes, such as e-mail messages, tasks, contacts, and calendar items.
 - Public folders.
 - Individual items in public folders.
 - Key Management Server (KMS).
 - Site Replication Server (SRS).
- Snapshot backup of the following:
 - Entire IS.
 - Individual or multiple storage groups.
- Snapshot recovery of the following:
 - Entire IS.
 - Individual or multiple storage groups or databases.

- NetWorker User for Exchange Server program, a graphical user interface for performing manual backup and recovery operations.
- Command line support for performing traditional backup and recovery operations from the command prompt.
- Disaster recovery for all Microsoft Exchange Server data.
- Automatic mount and unmount of Exchange databases.
- Microsoft Cluster Server (MSCS) support for performing backup and recovery operations in a clustered virtual server configuration.
- Windows Performance Monitor support, including performance counters for concurrent backup and recovery operations.
- Microsoft System Management Server (SMS) support, for performing automated installation of this NetWorker Module on a large number of Exchange server host computers.

NetWorker Module Interoperability

This section explains the interoperability of the NetWorker Module for Exchange Server with the NetWorker client and server software on various Microsoft Windows and Microsoft Exchange Server platforms.

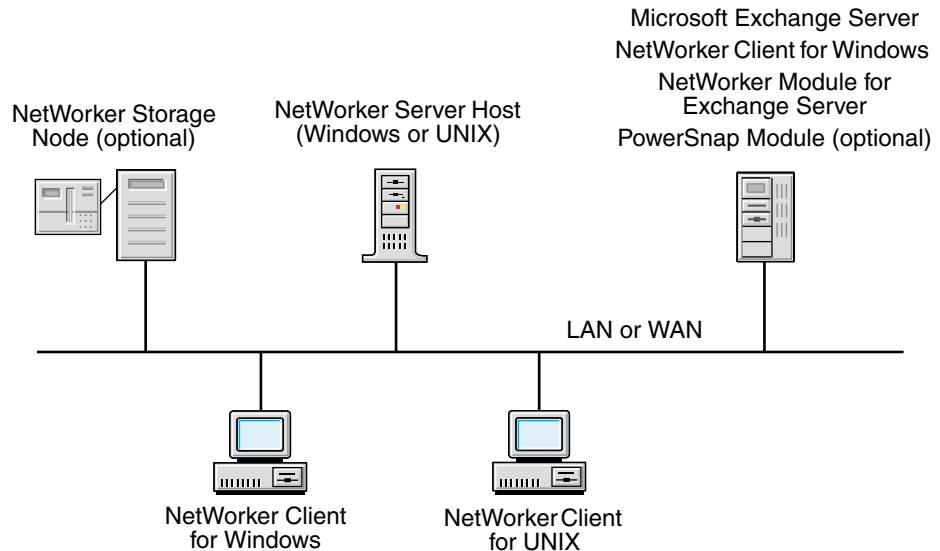
Using the NetWorker Module with NetWorker Software

The NetWorker software provides backup and recovery capabilities for file system and system state data only. A file system backup, however, does not save Exchange data in a recoverable form. This NetWorker Module extends the NetWorker software capabilities to connect to Microsoft Exchange Server software for the purpose of backing up and recovering Exchange data.

This NetWorker Module can connect to and interact with a NetWorker server running on *any* supported operating system platform. It is possible to run NetWorker server software and Microsoft Exchange Server on the same host computer, for example in a test environment. For production usage, however, it is typically recommended that you run the NetWorker server and Exchange server software on separate host computers.

The NetWorker client and NetWorker Module software must both be installed on the Exchange server host computer, and that host computer must be configured as a client of the NetWorker server. For snapshot support, a PowerSnap Module must also be installed on the Exchange server host computer. [Figure 1 on page 20](#) shows an example of a configuration.

Figure 1. Example of a Software and Hardware Configuration



NetWorker Software Compatibility

This NetWorker Module is interoperable with NetWorker software as follows:

- NetWorker release 6.0 or later is required for traditional backups of Exchange data.
- NetWorker release 7.1 or later is required for snapshot backup and recovery of Exchange data. This applies to recovery of data to the same Exchange server, or by directed recovery to a different Exchange server.

Backward Compatibility with Previous NetWorker Module Releases

Release 4.1 recovers backups that were completed by NetWorker Module releases 4.0, 4.0.x, and 3.x. This includes backups of:

- Exchange IS, KMS, and SRS databases
- Individual mailboxes or mailbox items
- Individual public folders or public folder items

Microsoft Windows and Exchange Server Compatibility

This NetWorker Module is interoperable with Microsoft Windows and Microsoft Exchange Server as follows:

- Traditional backup and recovery operations are supported on the following platforms:
 - Microsoft Exchange 2000 Server on Windows 2000
 - Microsoft Exchange Server 2003 on Windows 2000
 - Microsoft Exchange Server 2003 on Windows Server 2003
- Snapshot backup and recovery operations are supported for the following:
 - Microsoft Exchange 2000 Server on Windows 2000
 - Microsoft Exchange Server 2003 on Windows 2000
 - Microsoft Exchange Server 2003 on Windows Server 2003
- This release of the NetWorker Module does *not* support Microsoft Exchange Server 5.x.

Note: This NetWorker Module does not support use of nondefault database filename extensions. By default, Exchange database filenames end with *.edb* and *.stm* extensions. Database filenames that do not end with these standard extensions cannot be backed up or recovered.

For detailed system requirements information, refer to the Installation Guide.

Working with NetWorker PowerSnap Modules

NetWorker PowerSnap Module software works with the NetWorker and NetWorker Module software to enable continuous snapshot backups, ensuring high availability of Microsoft Exchange data. Because snapshot backups are relatively fast, frequent backups can be scheduled with minimal impact to network traffic or Exchange server performance.

Note: The number of snapshots that can be retained simultaneously on primary storage is dependent on storage subsystem hardware capabilities.

For instructions on installing and configuring PowerSnap Module software, and details about PowerSnap support for storage subsystem features, refer to the appropriate *NetWorker PowerSnap Module Installation and Administrator's Guide*.

For a current list of the available PowerSnap Modules, refer to the *LEGATO Compatibility Guides*, available at www.legato.com.

Homogenous Storage Platform Environment

This NetWorker Module supports snapshot backup operations in *homogenous* storage platform environments only. *All* Exchange database components (database files and transaction logs) must reside on snapshot-capable hardware. For environments in which any or all database components reside on storage hardware that is *not* snapshot capable, this NetWorker Module supports traditional backup and recovery operations only.

Note: Backups terminate with an error message if the NetWorker Module detects that Exchange objects reside on storage hardware that is not snapshot-capable.

Multiple Storage Subsystems

This NetWorker Module supports snapshot operations in environments where Exchange objects are located on multiple storage subsystems. Each storage subsystem must be snapshot-capable.

Serverless Backups

The NetWorker Module supports the *serverless backup* method for snapshot backups. In a serverless backup, a snapshot is created on the Exchange server's primary storage subsystem and immediately moved to secondary storage by a *proxy client*. This relieves the Exchange server host of moving the data to the secondary storage medium (typically tape).

LAN and LAN-Free Environments

This NetWorker Module supports snapshot operations in LAN and LAN-free environments. The serverless backup method is also supported in LAN and LAN-free environments. For more information about support for LAN and LAN-free environments, refer to the *NetWorker PowerSnap Module Installation and Administrator's Guide* for your storage subsystem.

Hot Snapshot Technique

Microsoft Exchange 2000 Server and Exchange Server 2003 do not support creating snapshots while the Information Store service is running. To implement snapshot support, this NetWorker Module uses the NetWorker PowerSnap solution in conjunction with the *hot snapshot* technique described in Microsoft Knowledge Base article 311898, *XADM: Hot Split Snapshot Backups of Exchange*. This involves creating snapshots while Exchange databases are running.

Note: Microsoft does not endorse the hot snapshot technique, and may not provide support for it. If problems occur, contact LEGATO Technical Support. For contact information, see ["Technical Support" on page 15](#).

Backup Operations

The following sections describe the features and functionality of this NetWorker Module's traditional and snapshot backup operations.

Traditional Backups

You can run a traditional *manual backup* of Exchange data at any time, completely independent of any scheduled backups that might be configured. For more information, see ["Performing a Manual Backup" on page 38](#).

To configure a *scheduled backup*, an administrator must set NetWorker server resource attributes by using one of the following:

- NetWorker Administrator program
- NetWorker Configuration Wizard

For more information, see ["Configuring Scheduled Backups" on page 52](#).

For traditional backups, the primary operation Microsoft Exchange Server supports is a *database* backup. A database backup uses the *Exchange Backup API* to save the database files and manage the transaction log files. The NetWorker Module provides the mechanism that integrates the Exchange database backup technology with NetWorker software features.

Database Backup Levels

Because the Exchange Backup API involves operations on both databases and transaction logs, it uses a different set of backup levels than the NetWorker software uses for backing up file systems.

[Table 1 on page 24](#) shows the backup levels for Exchange IS, KMS, and SRS databases.

Table 1. Levels for Traditional Database Backups

Exchange Server Backup Level	Exchange Objects Backed Up	Committed Log Files Truncated
Full	Databases and transaction logs	yes
Copy		no
Incremental	Transaction logs	yes
Differential		no

Before a partial or differential backup can be performed, databases must be backed up at level full or copy.

Note: If Exchange data resides on a snapshot-capable storage subsystem, and the appropriate PowerSnap Module is installed, traditional backups are supported *only* at levels full and copy:

- A request for an incremental backup is automatically converted to level full.
- A request for a differential backup is automatically converted to level copy.

Mailbox and Public Folder Backups

By using a database backup, you can recover individual mailbox and public folder items. However, this requires one of the following:

- Performing a full recovery to a Microsoft Exchange Server 2003 Recovery Storage Group (RSG) and use of the Microsoft **ExMerge** utility.
- Performing a *directed recovery* of the entire database to a separate recovery server.

The NetWorker Module provides a better solution—backup and recovery of mailboxes, public folders, and the items they contain. A backup of a mailbox or public folder is a *brick-level* backup. Each mailbox item is saved individually at the folder level, and each public folder item is saved individually at the item level. This allows for recovery of any mailbox or public folder item directly to the original Exchange server.

When you perform a mailbox (brick-level) backup, you have the option of specifying the level at which mailbox items can be recovered. The level is specified on the NetWorker Module tab of the Backup Options dialog box:

- The Folder Level setting allows for the recovery of mailbox items at the folder level only.

This results in smaller client file indexes, which greatly enhances the performance of the NetWorker server at recovery time. This setting is beneficial in large Exchange environments, where client file indexes can become extremely large.

- The Item Level setting allows for the recovery of individual mailbox items.

This setting provides finer granularity, but results in larger client file indexes on the NetWorker server. Public folder items can be recovered at the item level only.



Important: To be prepared to recover from a disaster, you must perform database backups. Mailbox or public folder backups, which are brick-level backups, cannot be used to restore a database or perform a disaster recovery.

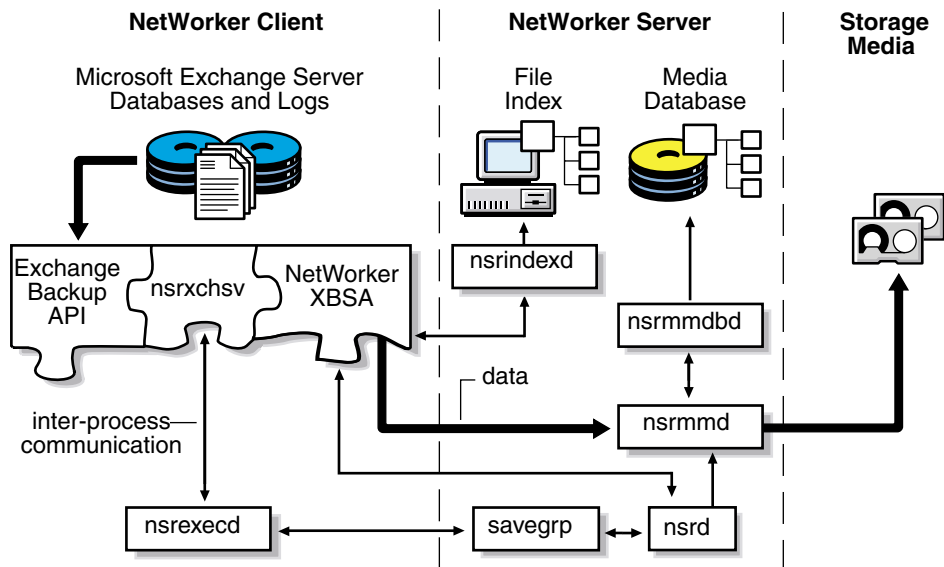
Issues to keep in mind about mailbox and public folder backups:

- They can be backed up *only* at level full.
- They take longer than a database backup, and may have a significant impact on memory and CPU usage of the Exchange server host.
- They do not take advantage of the Microsoft Exchange Server concept of single-instance storage.
- The save sets they produce may be much larger than the original data.
- The Item Level setting rapidly increases the size of the NetWorker *client file index*. This may require additional disk space on the NetWorker server.
- You cannot perform a brick-level recovery unless you have performed a brick-level backup.

Traditional Backup Process Overview

Figure 2 on page 26 shows an overview of the process interactions among the NetWorker client and server, NetWorker Module, and Exchange server software during a traditional scheduled backup.

Figure 2. Traditional Backup Command and Data Flow



When a traditional scheduled backup for a Microsoft Exchange Server client is triggered by **nsrmd** on the NetWorker server, **savegrp** executes the NetWorker Module backup command (**nsrxchsv**) on the client instead of performing a standard NetWorker save.

The `nsrxchsv` program passes the backup data from the Exchange server NetWorker client to the NetWorker server through an X-Open Backup Services Application Programming Interface (XBSA). The NetWorker server software performs all scheduling and storage management tasks.

Snapshot Backups

Snapshot backups are configured as scheduled backups on the NetWorker server. Although this NetWorker Module does not support manual snapshot backups, either from the NetWorker User for Exchange Server program or the command prompt, an administrator can manually start a scheduled snapshot backup at any time. For instructions, see ["Task 5: Test the Configuration" on page 66](#).

This NetWorker Module supports snapshot operations for Exchange databases only. Snapshot operations are *not* supported for KMS or SRS databases, or for mailbox or public folder items.

Note: Snapshot backups are *always* performed at the Exchange storage group level. All databases within a storage group are included in each snapshot backup. Because Microsoft Exchange Server maintains transaction logs at the storage group level rather than the database level, snapshots of individual databases can cause log file management problems during recovery.

Snapshot Backup Levels

This NetWorker Module performs snapshot backups at level full only. All databases and transaction logs are backed up. Requests for other backup levels are automatically converted to level full.

Snapshot backups can be configured to truncate committed transaction logs after the backup. For instructions on configuring the log truncation option, see ["Log File Truncation" on page 50](#).

Instant Backup

An *instant backup* creates a point-in-time copy, or snapshot, of Exchange data and retains the snapshot on the Exchange server's primary storage subsystem. Depending on how backups are configured, a snapshot created during an instant backup may or may not be moved to secondary storage on the NetWorker server or storage node. While the snapshot resides on the Exchange server's primary storage subsystem, it is referred to as a *persistent* snapshot. Retaining persistent snapshots on primary storage allows the NetWorker Module to perform an *instant restore*.

Depending on the storage subsystem hardware capabilities, you may want to schedule instant backups to occur frequently. For example, by spacing snapshots just a few hours apart, exposure to data loss is minimized; you can quickly return the Exchange server to a recent point in time.

Nonpersistent Backup

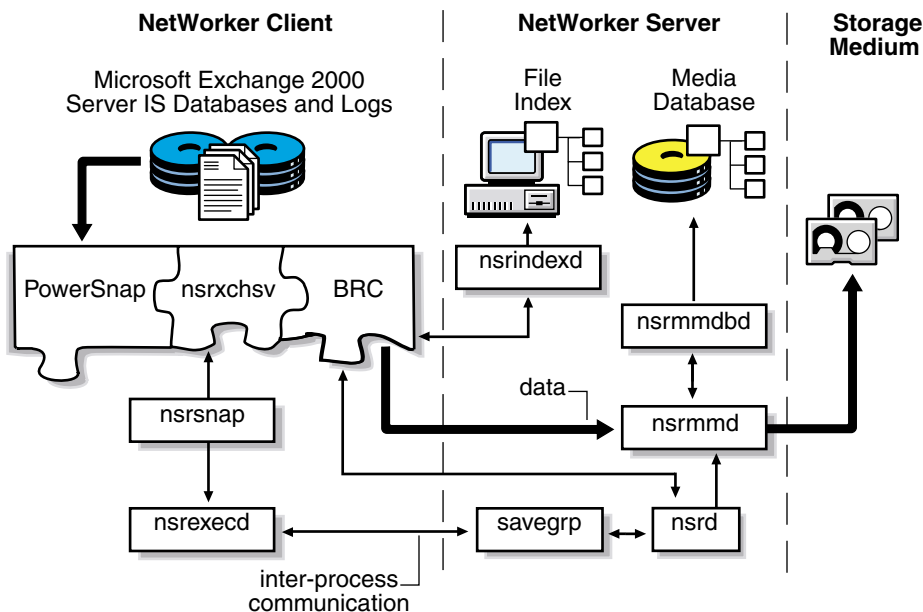
A *nonpersistent* snapshot backup creates a point-in-time copy of Exchange data, and then immediately moves it to secondary storage on the NetWorker server or storage node. The original snapshot is automatically deleted from primary storage.

Note: In NetWorker Module log files, the operation type for a nonpersistent snapshot backup operation is *conventional* backup.

Snapshot Backup Process Overview

[Figure 3 on page 29](#) shows an overview of the process interactions among the NetWorker client and server, NetWorker Module, PowerSnap Module, and Exchange server software during a snapshot backup.

Figure 3. Snapshot Backup Command and Data Flow



The PowerSnap Module *Backup Recover Control* (BRC) service, running on the Exchange server, provides snapshot functionality to the NetWorker Module. Through the BRC API, the NetWorker Module is able to determine if Exchange databases and transaction logs are located on snapshot-capable hardware, and therefore eligible for snapshot backups. The BRC API also provides NetWorker indexing and media database services, and allows the NetWorker Module to specify which files are moved to secondary storage.

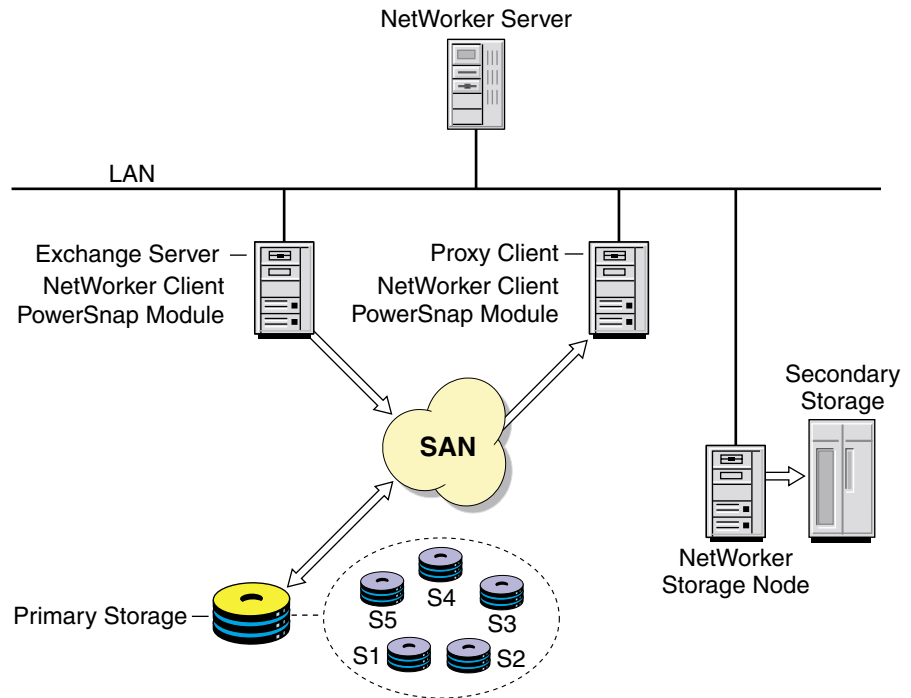
The PowerSnap Module's **nsrsnap** program is invoked when the NetWorker server initiates a scheduled snapshot backup. The **nsrsnap** program queries the NetWorker server for configuration information, such as the snapshot policy attribute settings, then executes the NetWorker Module's **nsrxchsv** backup program with a command that saves a snapshot on primary storage.

Backup with a Snapshot Data Mover

The snapshot *data mover* is the computer that actually moves the data during a snapshot operation. The Exchange server is the default data mover, however, you can set the `NSR_DATA_MOVER` environment variable to specify a different computer to act as data mover during a snapshot backup.

[Figure 4 on page 30](#) shows a configuration that uses a separate data mover node. In this case, the PowerSnap Module Client software must be installed on the data mover (or proxy client), and the PowerSnap `nrsnap_save` program on the data mover node performs the backup.

Figure 4. Snapshot Backup with Data Mover Node



Recovery Operations

You can recover data from a traditional or snapshot backup at any time by using the NetWorker User for Exchange Server program. Alternatively, you can recover data from a traditional backup by running the NetWorker Module recover command (**nsrxchrc**) from the command prompt. Recovering snapshot backups from the command prompt is not supported.

Recovery Phases

Recovery is the process that fully returns backed up data to its previous state, so the data is once again accessible to users. For Exchange data, the recovery process occurs in two phases:

- The *restore* operation — In this phase, the NetWorker Module retrieves a backup from a storage device and places the data in a specified location, so it is available to the Microsoft Exchange Server software. At this point, the data is not yet accessible to Exchange users.
- The *recovery* operation — Subsequent to the restore operation, Microsoft Exchange Server recovers the restored data by applying the restored transaction logs to the restored databases, as necessary. This ensures the databases are consistent, and returns the Exchange data objects to their state at the time of the last backup.

Depending on the context, *recovery* can refer to either of the following:

- The Microsoft Exchange Server recovery operation.
- The entire process, beginning with the NetWorker Module restore operation, and ending with the Exchange server recovery operation.

Directed Recovery

A directed recovery is an operation in which data is recovered to an Exchange server other than the one from which it was backed up. This NetWorker Module supports directed recovery of snapshot backups and traditional backups of the Information Store.

Note: Snapshot backups can be recovered to an Exchange server that does not have a snapshot-capable storage subsystem.

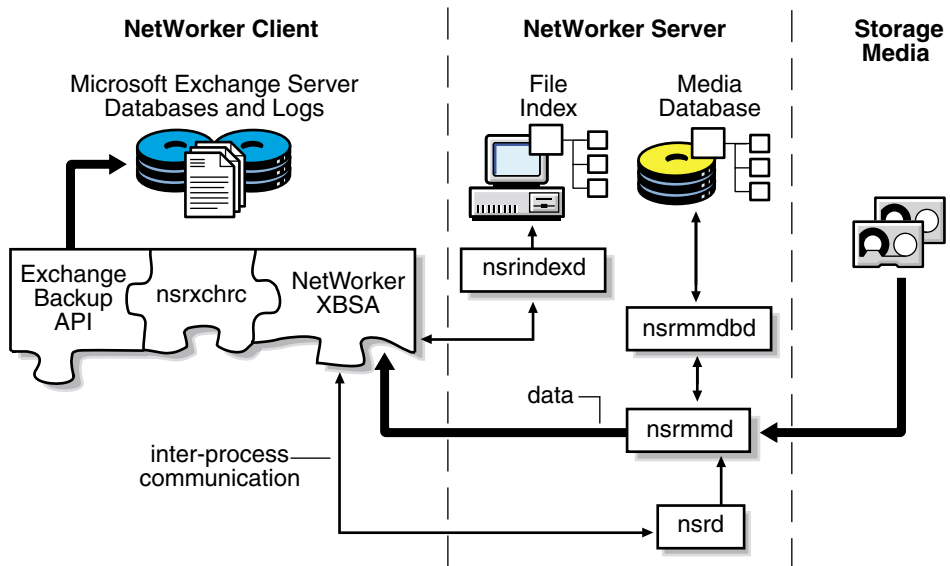
Traditional Recovery

For information about the kinds of Exchange objects that can be recovered from the various kinds of traditional backups, see ["Exchange Objects Recoverable from Traditional Backups"](#) on page 78.

Traditional Recovery Process Overview

Figure 5 on page 32 shows the NetWorker client and server interactions, and how data moves from the NetWorker client to the Exchange server during a traditional restore session initiated by the NetWorker Module.

Figure 5. Traditional Recovery Command and Data Flow



1. A request for a traditional restore operation invokes the NetWorker Module recover command, **nsrxchrc**.
2. The NetWorker XBSA API:
 - a. Translates the object names requested by the NetWorker Module into a format that the NetWorker software understands.
 - b. Forwards them to the NetWorker server **nsrd** service.

3. The media service, **nsrmmd**, invokes **nsrmmdbd** to search the NetWorker server's media database for the volumes that contain the objects requested.
4. After the media is mounted, **nsrmmd** sends the data through the NetWorker XBSA API to **nsrxchrc**, which recovers the data to the Microsoft Exchange Server directories.

Snapshot Recovery

Snapshot recovery can be performed at the Exchange storage group *or* database level.

Exchange Server Soft Recovery

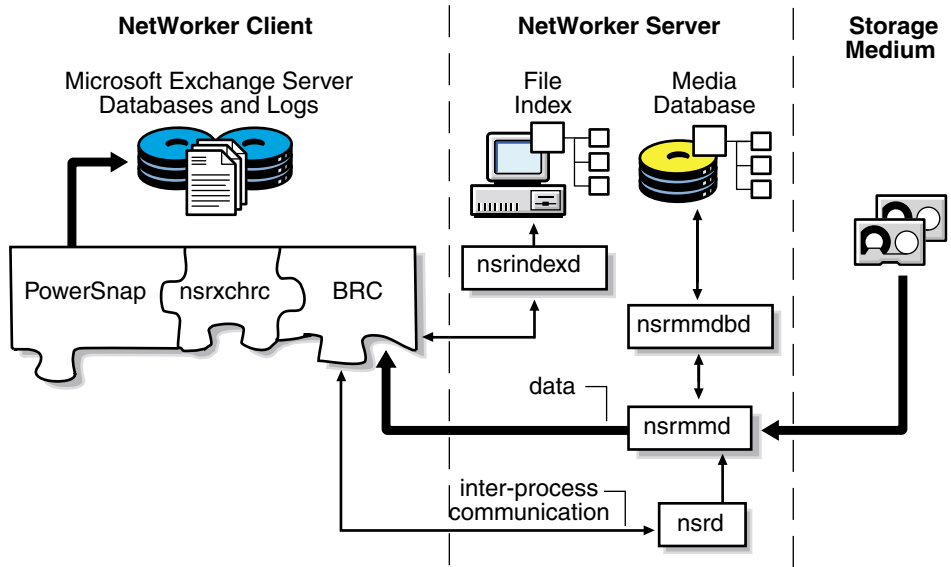
The recovery of a database from a snapshot backup requires the use of the Microsoft Exchange Server soft recovery process, which does the following:

- Verifying that the correct set of transaction logs is available.
- Replaying the logs to ensure that the database is consistent.

Snapshot Recovery Process Overview

[Figure 6 on page 34](#) shows the interaction among the NetWorker client and server, NetWorker Module, PowerSnap Module, and Microsoft Exchange Server software during a snapshot recovery operation.

Figure 6. Snapshot Recovery Command and Data Flow



A request for a snapshot restore invokes the NetWorker Module **nsrxchrc** command. Snapshot restores are managed by the PowerSnap BRC service, through the BRC API.

The BRC service interacts with the NetWorker server to locate the volumes containing the requested data.

Recovery with a Snapshot Data Mover

In cases where the NetWorker client with access to the snapshot backup is not the target Exchange server for the recovery, a different NetWorker client must be used as the data mover. In this case, the **nsrsnap_save** program on the data mover computer sends the data through the BRC API to the **nsrxchrc** program for recovery.

Related Documentation

The following sources provide additional information specific to this NetWorker Module:

- *NetWorker Module for Microsoft Exchange Server Installation Guide*
- *NetWorker Module for Microsoft Exchange Server Release Supplement*
- NetWorker User for Exchange Server Online Help

These sources—specific to the NetWorker server version—are also available:

- *NetWorker Administrator's Guide*
- *NetWorker Installation Guide*
- *NetWorker Release Supplement*
- NetWorker Administrator Online Help

Other documentation sources that provide helpful information include:

- *NetWorker Command Reference Guide*
- *NetWorker Error Message Guide*
- *NetWorker Disaster Recovery Guide*
- *PowerSnap Module Installation and Administrator's Guide* (for the appropriate PowerSnap Module)
- Microsoft Exchange Server documentation

For information about locating LEGATO documentation, see "[Product Documentation](#)" on page 13.

1

Chapter 2: Manual Backups

This chapter explains how to use the NetWorker User for Exchange Server program to manually back up Microsoft Exchange data. It includes the following sections:

- ["About Manual Backups" on page 35](#)
- ["Performing a Manual Backup" on page 36](#)



Important: This NetWorker Module does not support manual PowerSnap Module backups from the NetWorker User for Exchange Server program or the command prompt. PowerSnap Module backups must be initiated from the NetWorker Server.

About Manual Backups

You can initiate a *traditional backup* of Exchange data at any time. An unscheduled backup is called a *manual backup*, because you explicitly mark the Exchange objects you want to back up, manually configure the backup, and then start the process by clicking the Start button. The backup begins immediately, and saves the marked objects sequentially.

The best way to protect Exchange data is to schedule regular backups to start automatically at a set time. However, due to the complexity of configuring scheduled backups by using the *NetWorker Administrator program*, you should first back up data by using one of the following methods:

- Perform a traditional manual backup by using the NetWorker User for Exchange Server program.
- Perform a basic scheduled backup by using the NetWorker Configuration Wizard.

For details about schedule backups, see "[Chapter 3: Scheduled Backups](#)" on page 45.

Performing a Manual Backup

You can perform a manual backup by using either of the following NetWorker Module interfaces on the Exchange server:

- The NetWorker User for Exchange Server program. For instructions, see "[Performing a Manual Backup](#)" on page 36.
- The `nsrxchsv` command from the command prompt. For command syntax, see "[NetWorker Module Backup Commands](#)" on page 145.

Performing a Backup with NetWorker User for Exchange Server

To perform a manual backup, complete the following tasks:

- "[Task 1: Start the NetWorker User for Exchange Server Program](#)" on page 36
- "[Task 2: Configure the Backup](#)" on page 37
- "[Task 3: Set the Backup Options](#)" on page 39
- "[Task 4: Start and Monitor the Backup](#)" on page 44

Task 1: Start the NetWorker User for Exchange Server Program

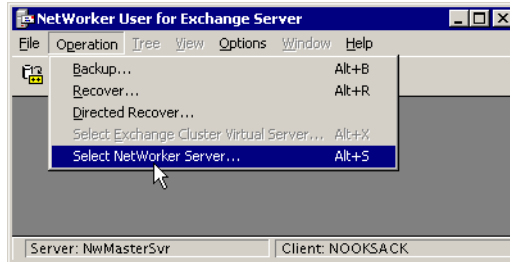
1. From the Windows Start menu, select the NetWorker User for Exchange Server program.

The program's main window appears, and the NetWorker Module attempts to connect to a NetWorker server.

Once the connection is made, the NetWorker server name appears on the status bar, at the lower left corner of the window.

- To connect to a different NetWorker server, select Select NetWorker Server from the Operation menu, as shown in [Figure 7 on page 37](#).

Figure 7. Main Window: Select NetWorker Server

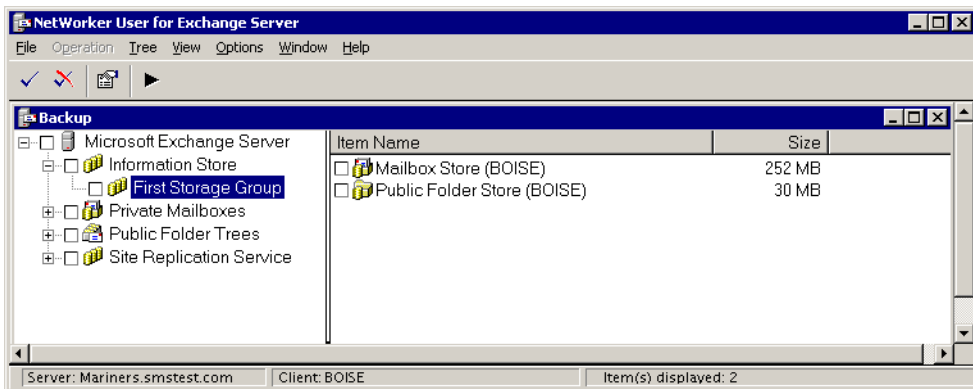


- The Change Server dialog box appears. Select a NetWorker server from the list and click OK.

Task 2: Configure the Backup

- Select Backup from the Operation menu (or click the Backup button on the toolbar). The Backup window ([Figure 8 on page 37](#)) displays a hierarchical list of the Exchange server's data objects available for backup.

Figure 8. Backup Window



- To expand an object, click the plus sign beside the object name. For example, click the plus sign beside Microsoft Exchange Server, then click the plus sign beside a storage group name to see the databases within the storage group. You can browse objects down to the individual item level in mailboxes and public folders.

- To mark one or more objects for backup, right-click the object name and select Mark.

When marking items, keep the following in mind:

- Marking an object automatically marks all objects nested beneath it.
- If an object's check box is *shaded*, some (but not all) of the objects nested beneath it are marked.
- Marking all objects nested beneath an object automatically marks the object itself.

For information on what the NetWorker Module backs up for each object type, see "[Effects of Marking Exchange Objects](#)" on page 39.

- To unmark an Exchange object, right-click the object and select Unmark.

Note: The Backup window does not retain object marking once the window is closed. If you close and reopen the Backup window, you must again mark the Exchange objects to be included in the next backup.

Effects of Marking Exchange Objects

[Table 2 on page 39](#) specifies the correspondence between the objects marked for backup and the objects the NetWorker Module actually backs up. For example, marking the Information Store object marks each database in every storage group within the IS.

Table 2. Effect of Marking Exchange Objects

Object Name	Backed Up Data
Information Store	All databases in all storage groups ¹
<storage_group_name>	All databases in a particular storage group ¹
<database_name>	A particular database
Private Mailboxes	All private mailboxes
<mailbox_name>	A particular mailbox
<mailbox_item_name>	A particular mailbox item ²
Public Folder Trees	All public folders
¹ In the backup process, individual databases are backed up sequentially. ² In the backup process, the folder containing the item is saved.	

Table 2. Effect of Marking Exchange Objects

Object Name	Backed Up Data
<public_folder_name>	A particular public folder
<public_folder_item_name>	A particular public folder item
¹ In the backup process, individual databases are backed up sequentially. ² In the backup process, the folder containing the item is saved.	

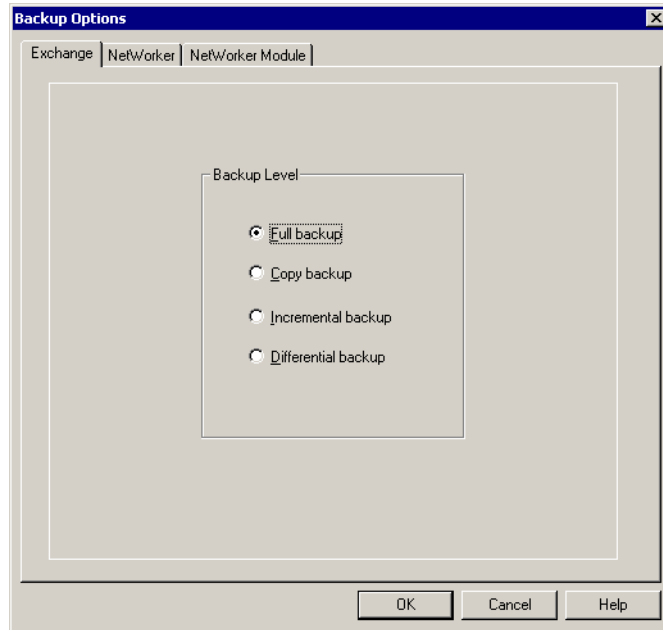
For information on what can be recovered from a backup of a particular type of object, see "[Exchange Objects Recoverable from Traditional Backups](#)" on page 74.

Task 3: Set the Backup Options

1. While the NetWorker User for Exchange Server Backup window is open, select Backup Options from the Options menu (or click the Options button on the toolbar). The Backup Options dialog box appears.

- On the Exchange tab ([Figure 9 on page 40](#)), select the backup level for Exchange IS, KMS, and SRS database backups. This setting does *not* control the backup level for individual mailboxes, public folders, or the items they contain; those objects are always backed up at level full.

Figure 9. Backup Options Dialog Box: Exchange Tab

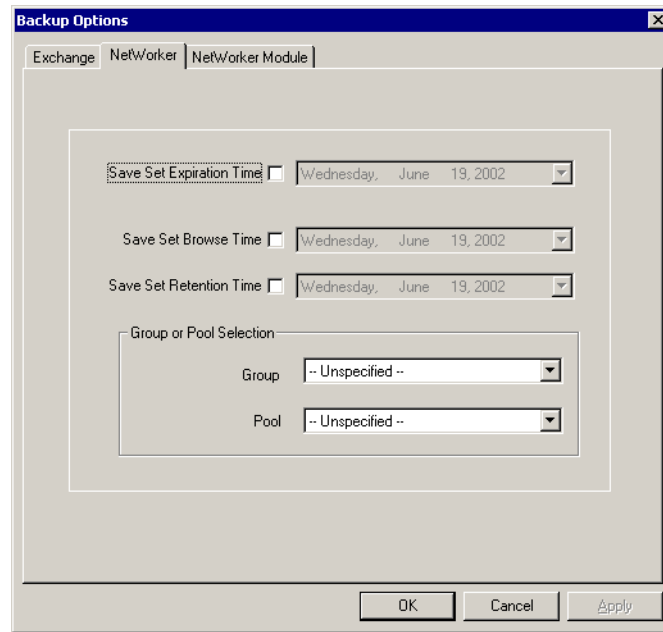


Notes:

- The NetWorker Module automatically performs a full or copy backup the first time Exchange data is backed up, even if an incremental or differential backup is specified.
- For more information about how the NetWorker Module uses backup levels, see ["Database Backup Levels" on page 24](#).
- For information about how the Exchange backup levels correspond to the levels the NetWorker software uses for file system backups, see [Table 6, "Microsoft Exchange Backup Levels," on page 62](#).

- On the NetWorker tab (Figure 10 on page 41), set the backup options that pertain to the NetWorker software.

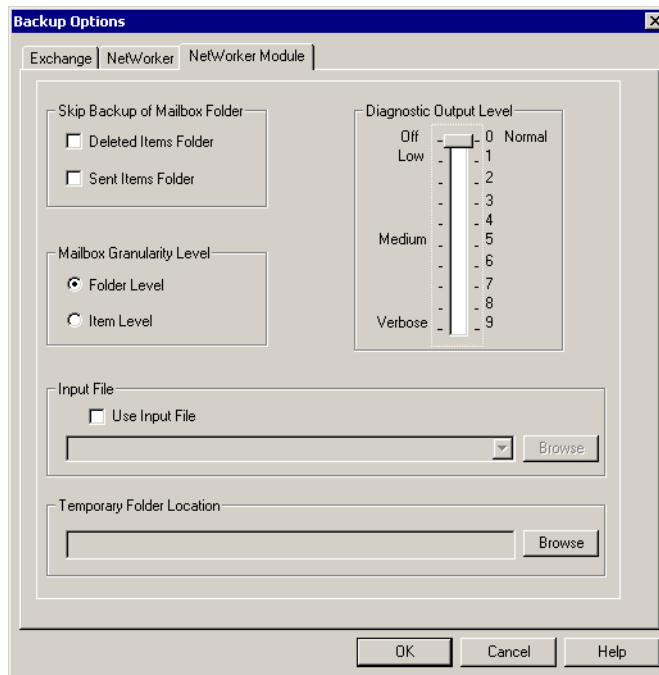
Figure 10. Backup Options Dialog Box: NetWorker Tab



- **Save Set Expiration Time** — Determines how long save set entries are browsable and the associated media volumes are excluded from automatic recycling. The expiration time cannot be set if the browse time or retention time is set.
- **Save Set Browse Time** — Determines how long save set entries are browsable. The browse time cannot be set if the expiration time is set. The retention time can be set if the browse time is set, but the retention time must be equal to or later than the browse time.
- **Save Set Retention Time** — Determines how long save set entries are excluded from automatic recycling. The retention time cannot be set if the expiration time is set. The browse time can be set if the retention time is set, but the retention time must be equal to or later than the browse time.

- Group Selection — This is an indirect way of specifying the pool used for the backup. The NetWorker server saves the data to the pool associated with the group selected. This option cannot be set if the Pool option is set.
 - Pool Selection — The pool to which the NetWorker server saves the backup data. This option cannot be set if the Group option is set.
4. On the NetWorker Module tab (Figure 11 on page 42), set the backup options that pertain to this NetWorker Module.

Figure 11. Backup Options Dialog Box: NetWorker Module Tab



- Skip Backup of Mailbox Folder — Provides the option of skipping the Sent Items folder and/or the Deleted Items folder during a backup operation. The setting applies to all mailboxes backed up during the operation.
- Mailbox Granularity Level — Determines the level at which backed up mailbox items will be available for recovery. Select Folder Level to configure the backup to allow recovery of mailbox items at the folder level only. Individual items will not be available for selection. Instead, all items within a specified folder will be recovered simultaneously. Select Item Level to configure the backup to allow recovery of individual mailbox items. Although this level provides finer granularity, it results in larger client file indexes on the NetWorker server. The default is Folder Level.
- Diagnostic Output Level — Determines the amount of detail that appears in the Backup Status window and is written to the `<NetWorker_install_path>\applogs\nsrxchsv.log` file during the next backup. In general, set this level above zero only when troubleshooting or closely monitoring a backup. Diagnostic output levels above zero are intended primarily for use by NetWorker Technical Support. The diagnostic messages are not documented.
- Input File — A file containing a list of the Exchange objects to back up. This is an alternative to marking objects for backup. For more information on input files, see ["Using Input and Exclude Files to Specify Objects for Backup"](#) on page 104.
- Temporary Folder Location — The folder where the NetWorker Module places temporary files during a mailbox (brick-level) backup. By default, the `<NetWorker_install_path>\tmp` directory is used. Temporary files are written to this location for mailbox operations only. A temporary folder location is not required for other types of backups, such as a storage group or database backup. It is also not required for PowerSnap Module backups. A temporary file as large as 2 GB may be created during backup of a single large mailbox or mailbox folder.

Task 4: Start and Monitor the Backup

1. Once you have configured the backup as instructed in Tasks 1 through 3, click the Start button.
2. While the backup is running, you can monitor the progress in the NetWorker User for Exchange Server program's Backup Status window.

Note: Mailbox sizes displayed in the Backup Status window reflect the size of the corresponding *.pst* files, and therefore do not exactly match the mailbox sizes displayed in the Backup window.

3. To cancel a backup at any time, select End Backup from the File menu, or simply close the Backup window while the backup is in progress.

Notes:

- If you encounter problems during the backup, see ["Chapter 8: Troubleshooting" on page 133](#).
- For information on using the Windows Performance Monitor to view the progress of the backup, see ["Using the Performance Monitor" on page 138](#).

Chapter 3: Scheduled Backups

This chapter explains how to configure scheduled backups of Exchange data. It includes the following sections:

- ["About Scheduled Backups" on page 47](#)
- ["Transaction Log Management" on page 49](#)
- ["Database Verification" on page 50](#)
- ["Configuring Scheduled Backups" on page 52](#)
- ["Checking Backup Results" on page 67](#)
- ["Usage Examples" on page 69](#)
- ["Excluding the Exchange 2000 Installable File System" on page 71](#)
- ["Improving Performance" on page 72](#)
- ["Backup Recommendations" on page 73](#)

About Scheduled Backups

The most reliable way to protect Exchange data is to schedule backups of the Exchange server to run at regular intervals. Scheduling backups for this NetWorker Module is similar to scheduling NetWorker backups of file systems. On the NetWorker server, appropriate attribute values must be set for various resources, such as Policy, Group, and Client resources. This is done by an administrator using the NetWorker Administrator program and requires a working knowledge of the NetWorker software.

An alternative method of scheduling backups is to use the NetWorker Configuration Wizard. The configuration wizard is available as an add-on tool to create one or more Client or Device resources for basic scheduled backups of NetWorker release 7.2 client computers and Microsoft Exchange Server data. The wizard integrates with this NetWorker Module by prompting users for information such as backup type, objects to back up, recovery level,

schedule preferences, and Exchange administrator account information. Once the wizard creates a resource, that resource can then be edited by using the NetWorker Administrator program.

To use the NetWorker Configuration Wizard to configure NetWorker Module for Exchange Server scheduled backups, you must first install the NetWorker release 7.2 or later client software, and then separately install the NetWorker Configuration Wizard. For instructions on how to install and use the NetWorker Configuration Wizard, refer to the *NetWorker, Release 7.2, Release Supplement*.

Once the configuration wizard is installed, you can proceed to install this NetWorker Module. During installation of the NetWorker Module software, you can choose to install the NetWorker Module for Exchange Server component of the NetWorker Configuration Wizard. This component allows you to use the NetWorker Configuration Wizard to configure scheduled backups of Exchange server data. For installation instructions, refer to the *NetWorker Module for Microsoft Exchange Server Installation Guide*.

To plan scheduled backups, it is important to understand the kinds of Exchange objects this NetWorker Module can recover from each backup type. For details, see the following:

- ["Exchange Objects Recoverable from Traditional Backups" on page 78](#)
- ["Exchange Objects Recoverable from Snapshot Backups" on page 81](#)

Note: Both traditional and snapshot backups ignore any databases included in a Recovery Storage Group (RSG). For more information, see ["Microsoft Exchange 2003 Recovery Storage Group" on page 79](#).

For a description of this NetWorker Module's backup capabilities, and information about the backup types and backup levels that can be configured, see ["Backup Operations" on page 23](#).



Important: To prepare for system failure or data loss on an Exchange server, you must develop a backup plan that includes scheduled NetWorker file system and system state backups *in addition to* regular NetWorker Module backups of Exchange data. For more information, see ["NetWorker File System and System State Backups" on page 75](#).

Transaction Log Management

Microsoft Exchange Server stores each database transaction in a log file before the transaction is committed to the database. Log file size is always 5 MB. Once the size limit is reached, the active log file is closed and a new log file is started. Depending on the level of activity on the Exchange server, transaction log files can accumulate quickly. To prevent log files from continuing to accumulate until the disk is full, Microsoft Exchange Server allows log file *truncation*. This shortens backup and recovery times, and conserves disk space.

Circular Logging

Microsoft Exchange Server supports *circular logging*, a technique for conserving disk space by overwriting log files after the data they contain has been committed to the database.

If circular logging is enabled, Microsoft Exchange Server does not permit incremental or differential backups, and only point-in-time recovery operations are permitted. Exchange Server does not use existing log files. By default, circular logging is disabled. In a normal production environment, you should not enable circular logging.



Important: Without complete transaction log files, you cannot recover anything more recent than the last full backup.

For more information about circular logging, refer to the Microsoft Exchange Server documentation.

Separation of Databases and Transaction Logs

For snapshot backups, the Exchange databases and transaction log files *must* reside on separate snapshot-capable volumes. This allows the NetWorker Module to take a snapshot of the database volumes first, then take a snapshot of the transaction log volume. For traditional NetWorker Module backup operations, Exchange databases and transaction logs should reside on separate volumes. If they do *not* reside on separate volumes, snapshot backups terminate with an error message.

Log File Truncation

After a successful traditional database backup at level full or incremental, the NetWorker Module automatically truncates log files containing transactions that have been committed to the database. Optionally, you can configure log file truncation to be performed after scheduled snapshot backups. How you manage log file truncation depends on the type of backups you use.



Important: Never manually delete transaction log files. Always allow the NetWorker Module backup operations to truncate them automatically.

3

Log Truncation with Snapshot Backups

If you use only snapshot backups (no traditional backups), be sure to enable log truncation for the snapshot full backups. Otherwise, the log files will never be truncated. To enable log truncation with snapshot backups, edit the Exchange server's Client resource on the NetWorker server. In the Application Information attribute, enter TRUNCATE_LOGS=yes. For instructions, see ["Task 3: Configure One or More Client Resources" on page 55](#).

Log Truncation with Mixed Backups

If you use mixed backup types (a combination of snapshot and traditional backups), always allow the traditional full backups to perform log file truncation, and leave the snapshot truncation option in its default (disabled) state in the Exchange server's Client resource.

Note: For Exchange data residing on a snapshot-capable storage subsystem, the NetWorker Module does not permit traditional incremental or differential backups. This helps ensure that the necessary log files are available for recovery in the event of a failure.

Database Verification

Database verification occurs during the backup process. As the Exchange Backup API reads each page from the database, it performs a checksum verification on the page. If a checksum error occurs, the backup fails. This prevents backup of a corrupted database.

Database Verification for Snapshot Backups

Because the snapshot backups are performed while Exchange databases are running, database verification cannot be performed at the time a snapshot is created. Therefore, it is not possible to determine at backup time if database corruption has occurred.

For snapshot backups, database verification is performed by default whenever a snapshot is moved to secondary storage on the NetWorker server or storage node. The NetWorker Module provides configuration options for performing database verification at other times, or not at all. Options are also available for controlling whether processing continues in the event that an error is encountered during verification. These options are configurable in the Application Information attribute of the NetWorker Client resource. For details, see "[Application Information Attribute Settings](#)" on page 59.

Note: Database verification messages are logged in the Exchange server's `<NetWorker_install_path>\applogs\lnmck_msexch.log` file.

Database Verification on a Nondefault Data Mover

For this NetWorker Module to perform database verification, the NetWorker Module software must be installed on the computer that acts as the data mover (the NetWorker client that actually moves the snapshot backup data). In addition, either a full Microsoft Exchange Server software installation, or the Microsoft Exchange System Management Tools must also be present on the data mover. In most cases, this is not a problem. By default, the Exchange server host acts as its own data mover.

However, for snapshot backups it is possible to configure a different NetWorker client to act as data mover. In that case, make sure at least the Microsoft Exchange System Management Tools are installed on the data mover host computer. For installation instructions, refer to the Microsoft Exchange Server documentation. For more information about configuring a data mover, refer to the appropriate *NetWorker PowerSnap Module Installation and Administrator's Guide*.

Configuring Scheduled Backups

Configure scheduled backups by using either the NetWorker Configuration Wizard or the NetWorker Administrator program. For instructions on using the NetWorker Configuration Wizard to configure a basic scheduled backup, refer to the *NetWorker, Release 7.2, Release Supplement*. To configure scheduled backups by using the NetWorker Administrator program, complete the following tasks:

["Task 1: Configure Snapshot Operations" on page 53](#)

["Task 2: Configure One or More Group Resources" on page 53](#)

["Task 3: Configure One or More Client Resources" on page 55](#)

["Task 4: Configure a Schedule and Set Backup Levels" on page 63](#)

["Task 5: Test the Configuration" on page 66](#)

The NetWorker Module can back up to a NetWorker server running on any supported operating system. For instructions on using the NetWorker Administrator program to configure NetWorker server resources, refer to the appropriate version of the *NetWorker Administrator's Guide*.



Important: Before beginning these tasks, ensure that the NetWorker Administrator program is configured to display hidden attributes:

- For NetWorker servers on Windows operating systems, select **Customize** from the **Options** menu. On the **Window Configurations** tab of the **Customize** dialog box, select **Display Hidden Attributes**.
 - For NetWorker servers on UNIX or Linux operating systems, select **Details** from the **View** menu.
-

Task 1: Configure Snapshot Operations

Note: This task is required only if you are scheduling snapshot backups. If scheduling traditional backups only, proceed to task 2.

To prepare the environment for performing snapshot operations with this NetWorker Module, the appropriate PowerSnap Module must be installed on the Exchange server host. Various NetWorker resources, such as a *snapshot policy*, must also be configured on the NetWorker server.



Important: This guide provides only the snapshot configuration information that is unique to this NetWorker Module. For general information about configuring snapshot operations for your storage subsystem hardware, and instructions for setting the necessary NetWorker server resources, refer to the appropriate *NetWorker PowerSnap Module Installation and Administrator's Guide*.

For a configuration example of scheduled snapshot backups of Exchange data, see "[Example: Using Traditional and Snapshot Backups](#)" on page 70.

Task 2: Configure One or More Group Resources

A NetWorker Group resource controls scheduled backups for a collection of NetWorker clients. The Group resource attributes define the backup start time, level, schedule, and other operating parameters of scheduled backups for each member client.



Important: The NetWorker software provides a preconfigured backup group named Default. You can use the Default group for traditional backups of Exchange data, however it is recommended that you create a custom backup group specifically for that purpose. This allows you to schedule backups of Exchange data to start at different times than NetWorker file system backups.

For an example showing how to use multiple groups for configuring different kinds of scheduled backups of Exchange servers, see "[Usage Examples](#)" on page 69.

Group Attribute Requirements

Table 3 on page 54 provides information about the Group resource attribute settings for the NetWorker Module for Exchange Server client.

Table 3. Group Resource Attribute Settings (Part 1 of 2)

Attribute	NetWorker Module Requirements
Interval	Specifies how often the group starts a scheduled backup. The default value is 24:00 (once a day).
Start Time	Specifies the time of day the group starts a scheduled backup. The default is 3:33 a.m. Note: When using multiple groups to back up the same client, be sure to set the start times far enough apart so that one group has time to finish its backups before the next group starts.
Level	To configure the group to perform backups at the same level every time, select the level. For more information about schedules and backup levels, see " Task 4: Configure a Schedule and Set Backup Levels " on page 63.
Schedule	Assign a schedule for the group. For more information about schedules and backup levels, see " Task 4: Configure a Schedule and Set Backup Levels " on page 63.
Inactivity Timeout	Specifies the maximum time, in minutes, that a client is given to fail to communicate back to the server. If a client takes longer to respond than the Inactivity Timeout value, the server considers the client as "stopped responding." When performing a scheduled mailbox backup, enter a value of 180 to ensure that the NetWorker Module has enough time to copy folders from the Exchange server into a <i>.pst</i> file. The NetWorker Module will then pass the <i>.pst</i> file on to the NetWorker server.

Table 3. Group Resource Attribute Settings (Part 2 of 2)

Attribute	NetWorker Module Requirements
Client Retries	<p>When the NetWorker server fails to connect to a client, this attribute specifies the number of times that the server will reattempt the connection before the backup is considered a failure. The first retry will not occur until after an attempt has been made to at least contact each client in the group. The value must be between 0 and 5.</p> <p>When performing a scheduled backup of an IS in a cluster, enter a value of 5 to ensure success in the event of a cluster failover. For scheduled backups of mailboxes and public folders, a value of 0 is recommended.</p>
Snapshot	<p>Determines whether or not the group is configured for snapshot backups. The default is False.</p> <p>To configure the group for snapshot backups, set this attribute to True. To configure the group for traditional backups, this attribute <i>must</i> be set to False.</p>
Snapshot Policy	<p>For instructions, refer to the appropriate <i>NetWorker PowerSnap Module Installation and Administrator's Guide</i>.</p>
Snapshot Pool	<p>For instructions, refer to the appropriate <i>NetWorker PowerSnap Module Installation and Administrator's Guide</i>.</p>

Task 3: Configure One or More Client Resources

Each Exchange server that uses the NetWorker Module must have at least one Client resource configured on the NetWorker server before it performs any backup or recovery operations.

The Client resource defines a set of attributes that specify client information, such as:

- Hostname
- List of save sets to be included in scheduled backups
- Backup command
- Application information that the NetWorker Module requires

Using Multiple Client Resources

Multiple NetWorker Client resources can be configured for the same computer. Each Client resource can be configured to back up different data. This allows the NetWorker server to associate different collections of backup data with the same computer.

There are a number of situations in which you might create multiple Client resources for an Exchange server. For example, to schedule regular file system backups in addition to regular NetWorker Module backups, you must create a separate Client resource for each type of scheduled backup.

For an example of how to use multiple Client resources, see ["Example: Using Multiple Client and Group Resources"](#) on page 69.

For information about configuring Client resources for NetWorker Module operations in a Microsoft cluster, see ["Scheduled Backups in a Microsoft Cluster"](#) on page 125.

Client Attribute Settings

[Table 4 on page 56](#) provides information about the Client resource attribute requirements for a NetWorker Module for Exchange Server client.

Table 4. Client Resource Attribute Settings (Part 1 of 3)

Attribute	NetWorker Module Requirements
Name	Enter the Exchange server's hostname. If you create multiple Client resources for the same Exchange server, use the same name for each.
Comment	If using multiple Client resources for the same Exchange server, enter a comment to identify the purpose of each.

Table 4. Client Resource Attribute Settings (Part 2 of 3)

Attribute	NetWorker Module Requirements
Save Set	<p>Enter one or more save set specifications for the Exchange objects you want backed up for this client. For example, to configure <i>traditional</i> backups of all storage groups in the Information Store, enter:</p> <p>MSEXCH:IS</p> <p>To configure <i>snapshot</i> backups of a specific storage group, enter:</p> <p>MSEXCH:SS /storage_group</p> <p>For a complete listing of valid save set specifications for the NetWorker Module, see "Appendix A: Save Set Notation and Command Syntax" on page 149.</p> <p>For information about running parallel backup processes, see "Parallel vs. Sequential Processing" on page 63.</p>
Group	<p>Select a backup group. For more information, see "Task 2: Configure One or More Group Resources" on page 53.</p>
Schedule	<p>Select a backup schedule. For more information, see "Task 4: Configure a Schedule and Set Backup Levels" on page 63.</p>
Browse Policy	<p>Select a browse policy to specify how long the NetWorker server retains <i>client file index</i> entries for this client's backups (Week, Month, Quarter, Year, Decade, or a custom policy).</p> <p>This determines how long the Exchange server's backups are "browsable" for recovery. For more information, see "Example: How Browse Time Affects the Files Used for Recovery" on page 89.</p>
Retention Policy	<p>Select a retention policy to specify the minimum length of time the NetWorker server maintains <i>media database</i> entries for this client's backups (Week, Month, Quarter, Year, Decade, or a custom policy).</p>
Storage Nodes	<p>If the NetWorker server will use one or more remote storage nodes to back up the Exchange server's data, enter the name of each storage node in the order they are to be used. The default storage node, <i>nrsrserverhost</i>, represents the NetWorker server.</p>

Table 4. Client Resource Attribute Settings (Part 3 of 3)

Attribute	NetWorker Module Requirements
Remote Access	<p>Enter the user ID or hostnames of other clients that are allowed to browse the index to recover the Exchange server's data. NetWorker administrators automatically have remote access rights. If this attribute is left empty, only administrators and users logged on to the Exchange server have access.</p> <p>Note: For <i>serverless backup</i>, this attribute must include the proxy client hostname.</p>
Remote User	<p>Enter the <i>domain\username</i> for the user under whose security context the backup program is to run. For example, if you enter <i>CORPORATE\jsmith</i>, the backup program (<i>nsrxchsv.exe</i>) runs with <i>jsmith</i>'s security permissions.</p> <p>Note: This is generally required only for mailbox (<i>brick-level</i>) backups.</p>
Password	<p>If you entered a user name in the Remote User attribute, you must enter the password for the Remote User account.</p>
Backup Command	<p>Enter the NetWorker Module backup command and any necessary command options. For example:</p> <p>nsrxchsv</p> <p>The maximum number of characters allowed in this attribute is 64. For information about command syntax, see "NetWorker Module Backup Commands" on page 153.</p>
Executable Path	<p>(Optional) Enter the path to the NetWorker executable files on this client. For example:</p> <p><i><NetWorker_install_path>\bin</i></p>
Application Information	<p>Enter attribute values as necessary to configure scheduled snapshot backups for the Exchange server. For details, see "Application Information Attribute Settings" on page 59.</p>

Multihomed Exchange Server

When the Exchange Server is a multihomed system with multiple Network Interface Cards (NIC), it is important to properly name Client resources to ensure that data is backed up to the correct NetWorker server. When creating the Client resource in the NetWorker Administrator program, do one of the following:

- In the Name attribute, enter the IP address of the NIC to which the NetWorker server is connected.
- On the Remote tab, use the `-c` option in the Backup command attribute to identify the correct NetWorker server. For example:

```
nsrxcshv -c client_name
```

where *client_name* is the hostname that corresponds with the NIC to which the NetWorker server is connected.

For more information about configuring Client resources, refer to the *NetWorker Administrator's Guide*.

Application Information Attribute Settings

[Table 5 on page 59](#) lists the values that can be specified in the Client resource Application Information attribute for the NetWorker Module client. Each setting must be specified on a separate line.

Table 5. PowerSnap Module Attribute Settings (Part 1 of 2)

Name	Description	Values
BR_APPCK_IGNORE_OBJERR	Ignore the database checksum error and continue performing the consistency check.	<ul style="list-style-type: none"> • No (default) • Yes
BR_APPCK_IGNORE_ERROR	Ignore all database checksum errors and continue to do the backup.	<ul style="list-style-type: none"> • No (default) • Yes

Table 5. PowerSnap Module Attribute Settings (Part 2 of 2)

Name	Description	Values
BR_APPCK_RUN	<p>Specifies when a database consistency check is performed for snapshot backups. For example, to configure consistency checks for all snapshot backups, enter:</p> <p>BR_APPCK_RUN=always</p> <p>For more information, see "Database Verification" on page 50.</p>	<ul style="list-style-type: none"> • never • always • instant • temporary • rollover <p>By default, a consistency check is run only when data is moved to tape (temporary and rollover).</p>
NSR_DATA_MOVER	<p>Specifies the hostname of the NetWorker client that moves snapshot backups from primary storage on the Exchange server to secondary storage on the NetWorker server or storage node. To configure serverless backups, you must specify a proxy client. For more information, see "Serverless Backups" on page 22.</p>	<ul style="list-style-type: none"> • Local host (default) • The <i>proxy client</i> hostname
NSR_SNAP_TYPE	<p>Specifies the snapshot provider.</p>	<p>Refer to the appropriate <i>NetWorker PowerSnap Module Installation and Administrator's Guide</i>.</p>
TRUNCATE_LOGS	<p>Specifies whether Exchange transaction logs are truncated after level full snapshot backups. If using traditional as well as snapshot backups, leave this option disabled and allow the traditional backups to perform log truncation automatically. For more information, see "Transaction Log Management" on page 49.</p>	<ul style="list-style-type: none"> • No (default) • Yes



Example: Client Resource Configuration

Figure 12 on page 61 shows the General tab of the NetWorker Administrator program's Create Client dialog box. In this example, a Client resource is being created for an Exchange server with the host name *EXSRV1*. This client resource is a member of the snapshot backup group; it performs scheduled snapshot backups of all storage groups on *EXSRV1*.

Figure 12. Create Client Dialog Box: General Tabs

Figure 13 on page 62 shows the Remote tab of the Create Client dialog box. In this example, remote access is granted to the following:

- The SnapRecov group on *RECSRV1* — This allows all members of the SnapRecov group on a recovery server named *RECSRV1* to perform snapshot directed recovery of *EXSRV1* data.
- All users on *MOVER1* — This allows a data mover node named *MOVER1* to perform serverless backups of *EXSRV1* data.

The Application Information field defines the following attribute settings:

- The primary storage subsystem type is EMC CLARiON.
- A node named *MOVER1* performs snapshot backups.
- Database consistency checks are performed on *all* snapshot backups.

Figure 13. Create Client Dialog Box: Remote Tab

The screenshot shows the 'Create Client' dialog box with the 'Remote' tab selected. The 'Remote access' dropdown is set to 'group=SnapRecov,host=RECSVR1' and 'host=MOVER1'. The 'Application information' dropdown is set to 'NSR_SNAP_TYPE=emcclar', 'NSR_DATA_MOVER=MOVER1', and 'BR_APPCH_RUN=always'. The 'Backup command' field contains 'nsrxcshv.exe'.

For more information about configuring Client resources, refer to the *NetWorker Administrator's Guide*.

Parallel vs. Sequential Processing

The NetWorker server starts a separate backup process on the client for each save set. For example, if you specify *MSEXCH:IS* in the client's Save Set attribute, only one client process is started to back up the entire Information Store.

If you specify multiple save sets, the NetWorker server starts a corresponding number of backup processes to run in parallel on the client. To back up several storage groups in parallel, specify each storage group as a separate save set.

For example, entering the following in the Save Set attribute causes the NetWorker server to run parallel processes for the two storage groups:

```
MSEXCH:IS/First Storage Group  
MSEXCH:IS/Second Storage Group
```

Note: Parallel processing does *not* apply to multiple databases in the same storage group; always back up databases within a storage group sequentially.

Task 4: Configure a Schedule and Set Backup Levels

As a NetWorker client, an Exchange server's backup schedule is controlled by a Schedule resource on the NetWorker server. The schedule determines what level of backup (for example, full or incremental) is performed on a given day.

The NetWorker server provides several preconfigured schedules, which you can also modify to meet your needs. Or you can create custom schedules by using the NetWorker Administrator program.

You can create multiple backup schedules, as long as you assign each a unique name. For example:

- For one group of servers, perform a full backup every three days, with incremental backups on the other days.
- For another group, perform a full backup only once a week, with incremental or differential backups on all other days.

Backing up Exchange servers can take several hours due to the size of items that must be backed up. A full backup takes longer than an incremental or differential backup. Generally, the backup schedule is set so that a full backup of each Exchange server is performed periodically, for example, once a week. Incremental or differential backups, may be performed more frequently, usually once a day.

Note: The backup levels that the NetWorker Module for Exchange Server uses are *not* the same as the backup levels that the NetWorker software uses for file system backups.

Figure 14 on page 64 shows the NetWorker Administrator dialog box for editing schedules, and the associated dialog box for assigning a backup level for each day.

Figure 14. Create Schedule and Set Level Dialog Boxes

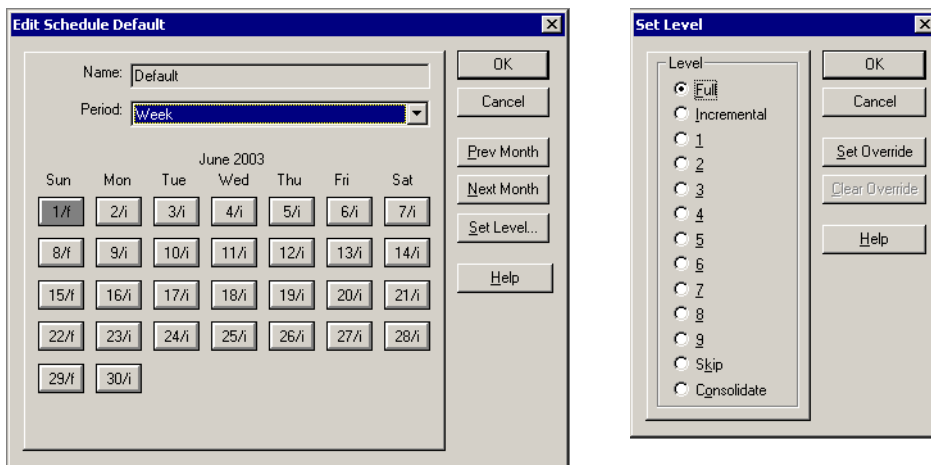


Table 6 on page 64 specifies how the Microsoft Exchange backup levels correspond to the NetWorker backup levels.

Table 6. Microsoft Exchange Backup Levels (Part 1 of 2)

NetWorker Level	Exchange Level	Exchange Database Backups	Mailbox or Public Folder Backups
Full	Full	Databases and transaction logs are backed up. For traditional backups, logs are always truncated; for snapshot backups, log truncation is optional.	Each object is backed up.
Incremental	Incremental	All transaction logs are backed up, then truncated. For databases residing on a snapshot-capable volume, the backup is converted to Full.	Backup is converted to Full.

Table 6. Microsoft Exchange Backup Levels (Part 2 of 2)

NetWorker Level	Exchange Level	Exchange Database Backups	Mailbox or Public Folder Backups
1	Differential	All transaction logs are backed up, but <i>not</i> truncated. For databases residing on a snapshot-capable volume, the backup is converted to Copy (level 9).	Backup is converted to Full.
2 – 8	Differential	Automatically converted to level 1 (differential) backup. For databases residing on snapshot-capable volumes, the backup is converted to Copy (level 9).	Backup is converted to Full.
9	Copy	Databases and transaction logs are copied. Logs are <i>not</i> truncated.	Backup is converted to Full.
Skip	Skip	Backup is skipped.	Backup is skipped.
Consolidate		Not applicable.	Not applicable.

Applying a Schedule

You can assign a backup schedule to a client or a group:

- To assign a schedule to an individual client, select the schedule name in the Schedule attribute of the Client resource. For more information see ["Task 3: Configure One or More Client Resources"](#) on page 55.
- To assign a schedule to a group, select the schedule name in the Schedule attribute of the Group resource. For more information see ["Task 2: Configure One or More Group Resources"](#) on page 53.

Note: You do not need to assign a schedule in order to back up a specific group at the same level every time. Instead, select an appropriate level from the Level attribute of the Group resource.

Task 5: Test the Configuration

To test the backup configuration, start the backup group manually. The NetWorker server immediately backs up the clients in the group, overriding the scheduled backup start time. Each client in the group is backed up at the level defined by the schedule that is selected in the client's Schedule attribute.

To write the results of a scheduled backup to a log file, enter the following in the Action attribute of the NetWorker Notification resource:

```
nsrlog -f filename
```

For instructions on configuring Notification resources, refer to the *NetWorker Administrator's Guide*.

3

How to Start a Backup of a NetWorker Server Running Windows

To start a group manually:

1. In the NetWorker Administrator program, click Manage Groups on the Configure tab.
2. Right-click the appropriate group, and select Start.
3. Click Yes.

How to Start a Backup of a NetWorker Server Running UNIX

To start a group manually:

1. In the NetWorker Administrator program, select Group Control from the Server menu to open the Group Control window.
2. Select the name of the appropriate group, and click Start.
3. Click OK.

Checking Backup Results

NetWorker software provides several ways to verify backup results:

- A series of messages written to the NetWorker Module log files on the Exchange server host (*nsr\applogs\nsrxchsv.log*).
- A scrolling list of messages displayed in the NetWorker Administrator program. These messages appear in three lists: pending save sets, completed save sets, and failed save sets.
- A “savegroup completion” notice upon completion of a scheduled backup.
- The specified backup level displayed in the NetWorker Administrator program:
 - On the Volumes or Indexes tab for NetWorker servers running Windows.
 - In the Volumes or Indexes window for NetWorker servers running UNIX.

Table 7 on page 67 shows the *media database* notation for each backup level.

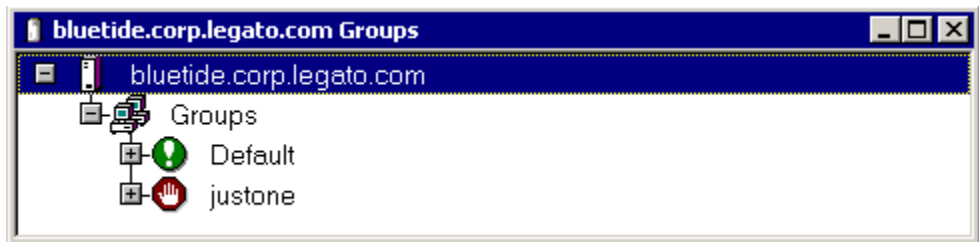
Table 7. Media Database Entries for Backup Levels

Microsoft Exchange Backup Level	Notation in the NetWorker Media Database
Full	full
Copy	9
Incremental	incr
Differential	1



Important: When a NetWorker group completes a backup, an icon appears beside the group name in the NetWorker Administrator program to indicate the completion status. For example, [Figure 15 on page 68](#) shows successful completion status for the Default group, and interruption status for the justone group. Presence of the green "success" icon does not necessarily mean that no errors occurred during the backup. If the backup of a save set fails, processing continues on subsequent save sets. Routinely check the *nsrxchsv.log* and *lnmck_msexch.log* files in the `<NetWorker_install_path>\applogs` directory to verify that no backup or database verification errors occurred.

Figure 15. Group Completion Status Icons



Usage Examples

The following examples provide an overview of the client and group configurations for two Exchange servers.



Example: Using Multiple Client and Group Resources

[Table 8 on page 69](#) shows an overview of the scheduled backup configuration for two Exchange servers, *EXSRV1* and *EXSRV2*. Each server has two NetWorker Client resources—one belonging to the Weekly IS Full group, the other to the Weekly file system Full group. Full backups are scheduled to run on weekends. Start times are staggered so each backup has time to finish before the next backup begins.

Table 8. file System and Exchange Backups

Group:	Weekly File System Full	Group:	Weekly IS Full
Interval:	24:00	Interval:	24:00
Start Time:	24:00 (Midnight)	Start Time:	21:00 (9:00 p.m.)
Client:	EXSRV1	Client:	EXSRV1
Save Set:	All	Save Set:	MSEXCH:IS
Schedule:	Full on Saturday Incremental on all other days	Schedule:	Full on Sunday Incremental on all other days
		Backup Command:	nsrxchsv
Client:	EXSRV2	Client:	EXSRV2
Save Set:	All	Save Set:	MSEXCH:IS/Storage Group 1 MSEXCH:IS/Storage Group 2
Schedule:	Full on Sunday Incremental on all other days	Schedule:	Full on Saturday Incremental on all other days
		Backup Command:	nsrxchsv



Example: Using Traditional and Snapshot Backups

This example shows a configuration for a combination of traditional and snapshot backups of Exchange data.

[Table 9 on page 70](#) shows a custom snapshot policy that creates four snapshots per day. Only the first snapshot is moved to secondary storage. All snapshots are deleted from primary storage after 24 hours.

Table 9. Custom Snapshot Policy

Name:	Four Snaps Daily
Comment:	Snapshot policy for Exchange backups
Number of Snapshots:	4
Retain Snapshots:	4
Snapshot Expiration Policy:	Day
Backup Snapshots	First

Table 10 on page 71 shows the groups and clients for an Exchange server named *EXSRV3*. The group's Interval attribute specifies that one snapshot is taken every six hours. The start time specifies that the first snapshot begins at 3:00 a.m. The group Level is set to Full, and no schedule is assigned to the group or client.

Table 10. Snapshot and Traditional Backups

Group:	Weekly Information Store Full	Group:	Daily Snapshot Full
Interval:	24:00	Interval:	6:00
Start Time:	21:00 (9:00 p.m.)	Start Time:	3:00 (3:00 a.m.)
		Level:	Full
		Snapshot:	True
		Snapshot Policy:	Four Snaps Daily
		Snapshot Pool:	Snap Backup File Device
Client:	EXSRV3	Client:	EXSRV3
Comment:	Client resource for traditional Exchange backups	Comment:	Client resource for snapshots
Schedule:	Full on Saturday Incremental on all other days	Save Set:	MSEXCH:SS (all storage groups)
Save Set:	MSEXCH:IS/Storage Group 1 MSEXCH:IS/Storage Group 2	Backup Command:	nsrxchsv
Backup Command:	nsrxchsv	Application Information:	NSR_SNAP_TYPE=emcclar NSR_DATA_MOVER=mover1

Excluding the Exchange 2000 Installable File System

The Microsoft Exchange 2000 Installable File System (ExIFS) allows file-level access to various Exchange server IS components, such as mailboxes and public folders. In Windows Explorer, the ExIFS appears as a volume with the drive letter M: assigned to it.

A scheduled file system backup of save set All attempts to back up the files on the M: drive. This is not successful because the Exchange server keeps many of the IS files open. It is also not possible to restore IS databases by recovering a backup of the ExIFS. For this reason it is usually best to skip the ExIFS during a file system backup. This can be done easily by creating a NetWorker *custom directive*.

How to Create a Directive to Exclude the ExIFS from Backups

Directives are special instructions that control how the NetWorker server processes files and directories during backup and recovery. A NetWorker administrator can create directives to customize the NetWorker process to your specific needs, maximize the efficiency of backups, and apply special handling to individual files or directories.

Note: For detailed information about creating and using NetWorker directives, refer to the Directives section of the *NetWorker Administrator's Guide*.

To create a custom directive to skip the file system backup of the ExIFS:

1. By using the NetWorker Administrator program, create a Directive resource on the NetWorker server.
2. In the Directive attribute, enter the following:

```
<< "M:" >>  
skip: *.*
```
3. By using the NetWorker Administrator program, edit the Client resource that backs up the Exchange server's file systems.
4. For the Directive attribute, select the name of the directive created in [step 1](#).

Improving Performance

To improve backup performance:

- Dedicate separate physical drives for the log files of the storage groups. When each set of log files has its own physical drive, server performance improves.
- Set backups for private mailboxes at separate times from backups of the IS. Even when they are in different backup groups, network congestion may result from performing these backups simultaneously.
- Set start times for different backup groups far enough apart that each backup operation can finish before the next backup operation starts.
- Set scheduled backups for times when the network is less busy, for example, nights and weekends.
- Do not back up the ExIFS. For more information, see ["Excluding the Exchange 2000 Installable File System" on page 71](#).

- Create a local directive (by using a *nsr.dir* file) to exclude file system backups of the Exchange database directories. For more information about local directives, refer to the *NetWorker Administrator's Guide*.
- Consider using snapshot backups in addition to traditional Exchange data backups.

Backup Recommendations

The following are recommendations for configuring scheduled backups of Exchange servers.

NetWorker Module Backups

Keep the following in mind when configuring scheduled NetWorker Module backups of Exchange data.

- Backing up an Exchange server can take several hours, because of the size of the Exchange objects. A full backup takes longer than an incremental or differential backup. Generally, the backup schedule should be set so that a full backup of each Exchange server is performed periodically, for example, once a week. Incremental or differential backups, may be performed more frequently, typically once a day.
- To improve post-recovery processing of Exchange databases, increase the frequency of full backups to minimize the number of transaction logs that are backed up.
- The log files for a storage group contain the database transactions for all mailbox or public folder databases in the storage group. For this reason, the storage group is the best unit for backup, because backups automatically include the transaction logs for all mailbox and public folder databases in the storage group. For snapshot backups, the storage group is the finest level of granularity. For traditional backups, individual databases can be backed up.
- If using snapshot backups, it is good practice to schedule periodic traditional backups as well. For example, you may want to schedule several snapshot backups per day, and daily traditional backups. In this case, allow traditional backups to handle the log truncation. For information about truncation, see "[Transaction Log Management](#)" on page 49.
- When scheduling a combination of snapshot and traditional backups, make sure the traditional backups have time to finish before a snapshot backup starts. If a snapshot backup starts to prepare a list of files to copy

while log truncation is taking place, some of the log files may be truncated by the time the snapshot is created. In this case, the truncated log files cannot be included in the snapshot.

- A performance gain from using snapshot backups is realized at recovery time. Recovering an *instant backup* from disk is much faster than recovering a snapshot that has been moved to tape, which has no real performance advantage over the traditional recovery method. Also, by creating frequent snapshots, the exposure to data loss is reduced since current data is available for instant recovery. If using snapshot backups, you should take several snapshots per day and retain them on primary storage.
- By default, database checksum verification is performed for snapshot operations only when the snapshot is moved to secondary storage. To ensure that verification is performed, either configure snapshots to be moved to secondary storage occasionally (for example, daily), or configure the Exchange server's Client resource to perform database verification at other times. For more instructions, see "[Task 3: Configure One or More Client Resources](#)" on page 55.
- During a scheduled mailbox backup, the NetWorker Module copies folders from the Exchange server into a *.pst* file, which is eventually passed on to the NetWorker server. If a folder is large, it can take the NetWorker Module a long time to copy it. Enter a value of 180 in the Inactivity Timeout Group resource attribute on the NetWorker server to ensure that the NetWorker Module has enough time to create the *.pst* file. The Inactivity Timeout attribute specifies the maximum time, in minutes, that a client is given to fail to communicate back to the server. If a client takes longer to respond than the Inactivity Timeout value, the server considers the client as stopped responding. For information about setting Group resource attributes, refer to the *NetWorker Administrator's Guide, Microsoft Windows Version*.
- Schedule traditional database backups so that they do not coincide with online defragmentation of the Exchange server. For more information about online maintenance of the Exchange server and its impact on performance, refer to Microsoft Knowledge Base article 271222, *XADM: Understanding Performance and Scalability Characteristics of Exchange 2000 MDB Online Maintenance*.

NetWorker File System and System State Backups

Only scheduled NetWorker backups can save all the information the NetWorker software needs to recover a client computer's file systems and system state configuration in the event of a disaster. A manual backup does not save the NetWorker client file indexes, or generate a NetWorker bootstrap file.

It is essential that you schedule regular, frequent NetWorker backups of the critical Windows components on the Exchange server host, and the domain controller for that host. This is typically done by backing up save set All.

For detailed information about backing up and recovering file systems and system state configuration, refer to the *NetWorker Administrator's Guide*.

Chapter 4: Recovering Data from a Backup

This chapter explains how to recover Microsoft Exchange data from a traditional or snapshot backup. It includes the following sections:

- ["Traditional Recovery Operations" on page 77](#)
- ["Snapshot Recovery Operations" on page 81](#)
- ["Performing a Recovery" on page 83](#)
- ["Recovering the KMS and SRS Databases" on page 99](#)
- ["Directed Recovery" on page 101](#)
- ["Replaying Transaction Logs" on page 104](#)

For additional information about recovering mailboxes and public folders, see ["Chapter 5: Mailbox and Public Folder Operations" on page 107](#).

For instructions on recovering Exchange data in a Microsoft cluster, see ["Chapter 6: Backup and Recovery in a Microsoft Cluster" on page 123](#).

Traditional Recovery Operations

You can perform a *traditional recovery* by using either of the following NetWorker Module interfaces on the Exchange server:

- The NetWorker User for Exchange Server program. For instructions, see ["Performing a Recovery" on page 83](#).
- The `nsrxchrc` command from the command prompt. For instructions, see ["Appendix A: Save Set Notation and Command Syntax" on page 149](#).

For an overview of how the NetWorker Module recovers data from traditional backups, see ["Traditional Recovery" on page 32](#).

Exchange Objects Recoverable from Traditional Backups

The Exchange objects that are backed up determine the objects that can be recovered. This is due to the way Microsoft Exchange Server processes and stores data. [Table 11 on page 78](#) lists the Exchange objects that can be recovered from various backup types.

Table 11. Objects Recoverable from Traditional Backups

Object Backed Up	Objects Recoverable
Information Store	<ul style="list-style-type: none"> • The entire IS (all storage groups and databases) • One or more storage groups • One or more databases, for example, a public folder database and a mailbox database
Storage group	<ul style="list-style-type: none"> • The entire storage group • One or more databases in the storage group, for example, a public folder database
All public folders	<ul style="list-style-type: none"> • Each public folder tree • One or more individual public folders • Individual items in a public folder
A public folder tree	<ul style="list-style-type: none"> • The entire public folder tree • One or more public folders in the tree • Individual items in a public folder
A single public folder	<ul style="list-style-type: none"> • The public folder • Individual items in the public folder
All private mailboxes	<ul style="list-style-type: none"> • One or more mailboxes • One or more folders in a mailbox • Individual items in a mailbox
A single mailbox	<ul style="list-style-type: none"> • The mailbox • Individual items in the mailbox
One or more individual mailbox or public folder items	The individual items

When preparing to recover Exchange data from a traditional backup, keep the following in mind:

- From a backup of the IS, the NetWorker Module *cannot* recover mailboxes, public folders, or the individual items they contain.
 - To recover these items from a database backup of Exchange Server 2003, use the RSG recovery method. For more information, see ["Microsoft Exchange 2003 Recovery Storage Group" on page 79](#).
The directed recovery method can also be used with Exchange Server 2003. For instructions, see ["Directed Recovery" on page 101](#).
 - To recover these items from a database backup of Exchange 2000 Server, you must first recover the database to a recovery server. For instructions, see ["Directed Recovery" on page 101](#).
- You cannot recover the IS from a backup of multiple private mailboxes or public folders.
- You can recover a *mailbox database* from any of the following backups:
 - The entire Exchange IS
 - The storage group that contains the mailbox database
 - The mailbox database as a single entity
- You can recover a *public folder database* from any of the following backups:
 - The entire Exchange IS
 - The storage group that contains the public folder database
 - The public folder database as a single entity

Note: You *cannot* recover a database from backups of the individual items the database contains. That is, you cannot reconstruct a mailbox or public folder database from backups of its constituent mailboxes, public folders, or individual mailbox or public folder items.

Microsoft Exchange 2003 Recovery Storage Group

Exchange Server 2003 Recovery Storage Group (RSG) is a powerful new Microsoft feature, designed to simplify recovery of mailboxes from a database backup.

RSG enables you to recover and mount a second copy of a mailbox database on the original server. By using this method, you can quickly return a failed Exchange server to service, before restoring lost mailbox items. Microsoft refers to this as establishing an e-mail *dial tone*. Users are able to access the Exchange server to send and receive new e-mail, even though they cannot yet access the items lost during the failure.

The NetWorker Module for Exchange Server fully supports the RSG recovery method. If an RSG is present when you recover a mailbox database, the recovered database is automatically written to the RSG.

Mailboxes in the RSG are disconnected from Active Directory user accounts, and are not accessible to users with an e-mail client. Once a database has been recovered to the RSG, you can use the Microsoft **Exmerge** utility to move recovered mailbox data to the original storage group, and thereby make it accessible to users.

Note: Recovery databases in the RSG are not backed up, either by traditional or snapshot backups.

The following restrictions and rules apply to the use of an RSG:

- The RSG can contain only mailbox databases. Public folder databases are not supported.
- The RSG can contain multiple mailbox databases, but all databases must belong to the same storage group. It is not possible for the RSG to contain databases from multiple storage groups.
- Recovery databases in an RSG should not be mounted until after they have been restored from a backup.
- Databases in the RSG must be manually unmounted before a recovery is started, and manually mounted when the recovery is finished. By default, databases are unmounted when they are added to the RSG. This differs from recovery with traditional storage groups because Exchange 2003 Server does not support Collaboration Data Objects for Exchange Management (CDOEXM) for RSG objects.

For instructions on using the NetWorker Module for Exchange Server with an RSG, see "[Task 1: Prepare to Recover to an RSG \(Optional\)](#)" on page 83.

Note: Additional information, including a detailed description of how to create an RSG and how to move data from an RSG into a production database, is available in Microsoft Knowledge Base article 824126, *How to Use Recovery Storage Groups in Exchange Server 2003*.

Snapshot Recovery Operations

You can perform a snapshot recovery by using the NetWorker User for Exchange Server program. For instructions, see ["Performing a Recovery" on page 83](#).



Important: All snapshot recovery operations are initiated from the NetWorker User for Exchange Server program. Use of the `nsrxchrc` program from the command prompt to restore snapshots is not supported. This helps protect data by ensuring that the required values for each snapshot recovery are correctly applied.

For an overview of how the NetWorker Module recovers data from snapshot backups, see ["Snapshot Recovery" on page 33](#).

Exchange Objects Recoverable from Snapshot Backups

[Table 12 on page 81](#) lists the Exchange objects that can be recovered from snapshot backups.

Table 12. Objects Recoverable from Snapshot Backups

Object Backed Up	Objects Recoverable from the Backup
Information Store	<ul style="list-style-type: none"> • The entire IS (all storage groups and databases) • One or more storage groups • One or more databases, for example, a public folder database and a mailbox database
Storage group	<ul style="list-style-type: none"> • The entire storage group • One or more databases in the storage group, for example, a public folder database

When preparing to recover Exchange data from a snapshot backup, keep the following in mind:

- The lowest level of granularity supported for a snapshot recovery is an individual Exchange database in its entirety. It is *not* possible to recover file-level database components (*.edb*, *.stm*, or *.log* files).

- It is *not* possible to recover individual mailboxes, public folders, or the items they contain *directly* from a snapshot backup. You must first perform a directed recover of the database to a recovery server. For instructions, see "[Directed Recovery](#)" on page 101.
- Snapshot recovery does not support relocation of either databases or log files. The following Exchange configuration parameters must exactly match the settings at the time of the backup:
 - Paths to the *.edb* and *.stm* files
 - Path to the storage group transaction log location
 - Path to the storage group system path location
 - The storage group prefix must match the original storage group prefix (this is necessary because the prefix identifies the log files)

Instant Restore

An *instant restore* operation is the process of restoring selected Exchange data objects from a mounted point-in-time copy that was created during an instant backup. Instant restore overwrites data at the Exchange storage group or database level, not at the volume level. If a volume contains data that was not included in the instant backup, it is left intact during the instant restore.

To specify the locations to search for a recoverable snapshot backup, and the order in which to search, set the snapshot recover options. By default, the NetWorker Module first searches for a snapshot backup residing on disk in the Exchange server's primary storage subsystem; if none is found, secondary storage on the NetWorker server or storage node is searched. For more information, see "[Task 7: Set the Recovery Options](#)" on page 93.

The performance of the restore operation can vary greatly, depending on whether the snapshot is recovered from a local disk, or a secondary storage medium such as tape. The speed advantage of instant restore can only be realized when the snapshot is restored from a persistent snapshot.



Important: Before performing an instant restore operation, ensure that the storage subsystem has sufficient resources to hold the data to be restored. The instant restore operation fails if the subsystem does not have sufficient space allocated to the repository or cache. If failure occurs, the source Exchange server is left in an unknown state, and the snapshot is deleted from the storage subsystem.

Performing a Recovery

To recover Exchange data from a backup, perform the following tasks:

- ["Task 1: Prepare to Recover to an RSG \(Optional\)" on page 83](#)
- ["Task 2: Set Exchange Database Properties to Allow Restore" on page 84](#)
- ["Task 3: Set Up the Recovery" on page 86](#)
- ["Task 4: Specify the Browse Time \(Optional\)" on page 89](#)
- ["Task 5: Select a Backup Version \(Optional\)" on page 91](#)
- ["Task 6: View the Required Backup Volumes \(Optional\)" on page 92](#)
- ["Task 7: Set the Recovery Options" on page 93](#)
- ["Task 8: Start the Recovery" on page 98](#)
- ["Task 9: Verify the Recovery" on page 99](#)

Note: To use the RSG recovery method, see ["Microsoft Exchange 2003 Recovery Storage Group" on page 79](#), and refer to the Microsoft documentation on configuring and using an RSG before beginning the recovery.

Task 1: Prepare to Recover to an RSG (Optional)

Perform this task only if you plan to use a Microsoft Exchange 2003 Server Recovery Storage Group for the recovery. For more information about the RSG recovery method, see ["Microsoft Exchange 2003 Recovery Storage Group" on page 79](#).

To recover a mailbox database by using the NetWorker Module with an RSG:

1. If an RSG does not already exist on the Exchange server, create one as follows:
 - a. Start the Microsoft Exchange Server Manager program.
 - b. Right-click the Exchange server name and select New>Recovery Storage Group.
 - c. Enter the name for the RSG and click OK.
2. Right-click the RSG name and select "Add databases to Recovery Storage Group." Add all mailbox databases to be recovered.

Note: By default, databases added to the RSG are set to allow overwrite by restore. To verify this setting before beginning the recovery, see ["Task 2: Set Exchange Database Properties to Allow Restore" on page 84](#).

3. Start the NetWorker User for Exchange Server program and perform a normal traditional recovery, as explained in the remaining tasks in this procedure.

Note: If an RSG is present, Exchange 2003 Server automatically directs mailbox databases to it during the recovery operation. No special set up for the recovery is required in the NetWorker User for Exchange Server program.

4. Once the mailbox database is recovered to the RSG, you can use the Microsoft **Exmerge** utility to merge mailbox data into the production database. You can also move log files into the RSG restore area to perform a complete recovery operation, up to the point of failure. For detailed instructions on these and other techniques for managing data in an RSG, refer to the Microsoft documentation.

Task 2: Set Exchange Database Properties to Allow Restore

To recover an Exchange database, you must first set the database properties to allow the database to be overwritten with restored data.

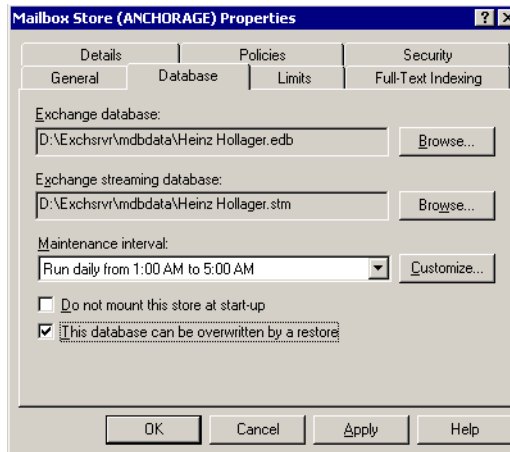


Important: This task is required before any traditional or snapshot recovery in which an Exchange database will be restored. It is *not* required when restoring a KMS database, SRS database, mailboxes, or public folders.

To allow an Exchange database to be overwritten:

1. Start the Exchange System Manager.
2. Right-click the Exchange database to recover, and select Properties.
3. On the Database tab of the Database Properties dialog box, select "This database can be overwritten by a restore," as shown in [Figure 16 on page 85](#).

Figure 16. Exchange System Manager Database Properties Dialog Box



Task 3: Set Up the Recovery

To set up the recovery:

1. Start the NetWorker User for Exchange Server program.
 2. Select Recover from the Operations menu, and select one of the following from the submenu:
 - Traditional — Displays the Recover window for viewing and marking objects for a *traditional* recovery. This is the equivalent of clicking the Recover button on the toolbar.
- [Figure 17 on page 86](#) shows an example of the window with the entire Information Store marked for recovery.
- Snapshot — Displays the Recover window for viewing and marking objects for a *snapshot* recovery. This is the equivalent of clicking the Snapshot Recover button on the toolbar.

Figure 17. Recover Window for Traditional Operations

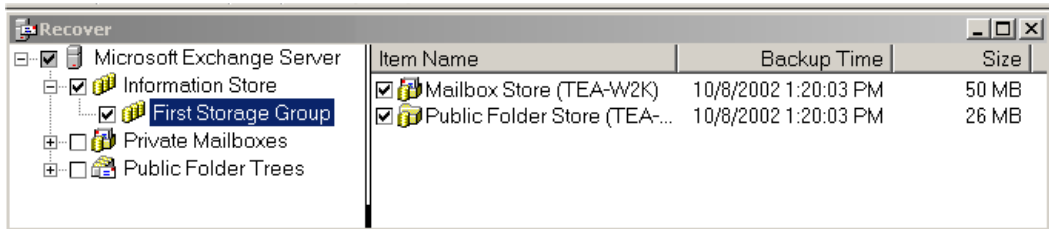
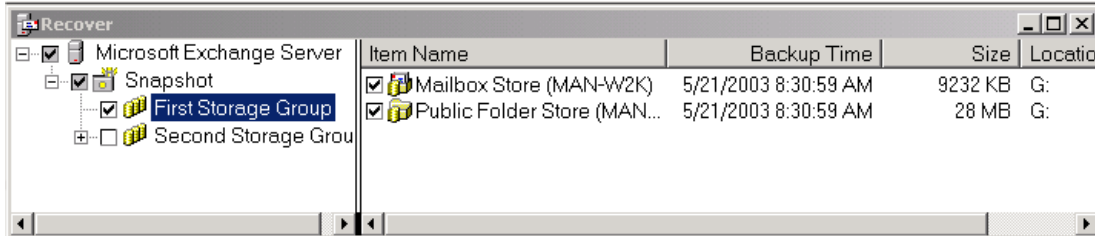


Figure 18 on page 87 shows an example of the window with one storage group marked for recovery.

Figure 18. Recover Window for Snapshot Operations



Note: The snapshot Recover window displays all available snapshot backups, regardless of whether they reside on a primary storage subsystem disk or have been moved to secondary storage on the NetWorker server or storage node. You can specify where the NetWorker Module searches for a recoverable snapshot on the Snapshot tab of the Recover Option dialog box. For more information, see ["Task 7: Set the Recovery Options" on page 93](#).

3. While the Recover window is displayed, you can perform the following *optional* setup tasks:
 - Change the browse time. By default, the *browse time* is automatically set to the date and time the Recover window is opened. To change the browse time, see ["Task 4: Specify the Browse Time \(Optional\)" on page 89](#).
 - Select a backup version. By default, the NetWorker Module recovers the most recent backup version of the object. To select a different backup version, see ["Task 5: Select a Backup Version \(Optional\)" on page 91](#).
 - View a list of the required backup volumes (for traditional recoveries only). To view a list of the required backup volumes, see ["Task 6: View the Required Backup Volumes \(Optional\)" on page 92](#).
 - Check and change configuration options. The NetWorker Module provides several options for controlling how the recovery is performed. To check these settings and change them, see ["Task 7: Set the Recovery Options" on page 93](#).

4. Navigate to the object or objects to mark for recovery. To expand or collapse an object in the Recover window, do one of the following:
 - Click the plus or minus sign beside the object. For example, click the plus sign beside a storage group to see the databases it contains.
 - Select an object, then select one of the following from the Tree menu:
 - Expand One Level — Displays one additional hierarchical level in the tree of Exchange objects.
 - Expand Branch — Displays all objects contained in the selected Exchange object.
 - Expand All — Displays all Exchange objects that can be backed up or recovered as of the browse time currently in effect.
 - Collapse Branch — Hides (collapses) all objects contained in the selected Exchange object.



Important: When recovering mailboxes, the Recover window cannot display objects backed up with release 4.1 of the NetWorker Module *and* objects backed up with earlier releases. To recover objects backed up with different NetWorker Module releases, you must perform two separate recovery operations. Recover objects backed up with NetWorker Module release 4.1, then change the browse time so objects backed up with earlier releases are visible in the Recover window. Mark the objects to recover and proceed with the second recovery operation. For details on changing the browse time, see ["Task 4: Specify the Browse Time \(Optional\)" on page 89](#).

5. Mark objects to recover by using any of the following methods:
 - Select the object; then click the Mark button on the toolbar.
 - Select the check box beside the object.
 - Right-click the object and then select Mark.

Note: Marking a container object automatically marks all the objects in that container. For example, marking a storage group marks all databases in that storage group.

6. Once the recovery is set up, start the operation. For more information, see ["Task 8: Start the Recovery" on page 98](#).

Task 4: Specify the Browse Time (Optional)

By default, the *browse time* is set to the current date and time. To recover an object from a traditional or snapshot backup prior to the most recent backup, you can specify a different browse time.

The browse time in effect appears at the lower right corner of the main window, on the status line. The Recover window displays the recoverable objects available for the selected browse time.

The NetWorker Module uses the browse time as a reference point for identifying the files that must be restored to fulfill a particular recovery request. When selecting the browse time, make sure the time falls between two previous backup times. Do not set a browse time to coincide closely with the time of a previous backup, when backup data was perhaps being written to the NetWorker server.

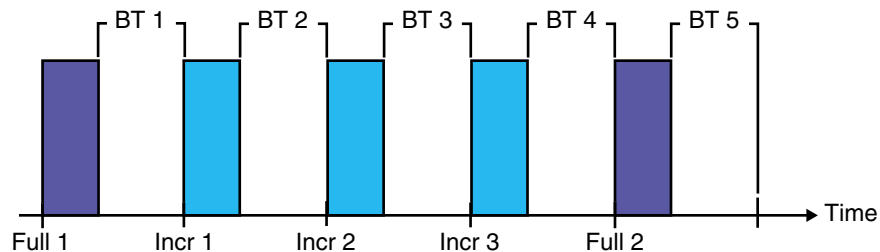
If you select a browse time that is earlier than the time of the first backup, the *client file index* is empty. If you set the browse time to a future point in time, the objects from the most recent backup appear in the Recover window.



Example: How Browse Time Affects the Files Used for Recovery

This example illustrates how the set of files required for recovering Exchange objects changes according to the selected browse time. The timeline in [Figure 19 on page 89](#) shows a sequence of backup operations: a full backup, followed by three incremental backups, and then another full backup.

Figure 19. Browse Time Selection



- To recover the data backed up in the first full backup (Full 1), select a browse time in the range BT1 (that is, any point after Full 1 ends, but before Incr 1 begins).
- To recover both Full 1 and Incr 1, select a browse time in the range BT 2 (that is, any point after Incr 1 ends, but before Incr 2 begins).
- If no browse time is selected, the NetWorker Module defaults to the current time. This has the effect of selecting Full 2.

[Table 13 on page 90](#) summarizes the backups that are recovered for each Browse Time range shown in [Figure 19 on page 89](#).

Table 13. Effects of Browse Time Selection

Browse Time Selection Range	Backup That Is Recovered
BT 1	Full 1
BT 2	Full 1 + Incr 1
BT 3	Full + Incr 1 + Incr 2
BT 4	Full + Incr 1 + Incr 2 + Incr 3
BT 5	Full 2

To set the browse time:

1. Display the Recover window. For instructions, see ["Task 3: Set Up the Recovery" on page 86](#).
2. Select Change Browse Time from the View menu. The Change Browse Time dialog box appears.

Note: Whenever the Change Browse Time dialog box is opened, the browse time is reset to the default date and time.
3. In the Change Browse Time dialog box, select a date from the calendar. Click Previous Month or Next Month to move the calendar to a different month.
4. Enter a time (for example, 10:28p) and click OK. Valid time values are:
 - Hours: 0 through 12
 - Minutes: 0 through 60
 - "a" for a.m., or "p" for p.m.

Task 5: Select a Backup Version (Optional)

By default, the NetWorker Module recovers the most recent version of an Exchange object. However, an object may have been backed up many times before there is a need to recover it. If you want to recover a version of an object other than the most recent, you can select a different version.

When you first display the Recover window, it lists the most recent versions of the objects available for recovery. By using the Versions feature, you can view a listing of all of the past versions currently available in the NetWorker server's *client file index*. For example, if backups are maintained online for one year, you might see versions of an object dating back a full year.

To select the version of an object for recovery:

1. In the Recover window, select the object you want to recover. For instructions, see ["Task 3: Set Up the Recovery" on page 86](#).

Note: If the Microsoft Exchange Server object is selected in the left pane of the Recover window, the View Versions feature is disabled.

2. From the View menu, select Versions. The Versions dialog box appears, with a listing of all available versions of the selected object.

Versions are sorted according to backup times, with the most recent version selected by default. The following information is shown:

- Name — The name of the selected object
- Size — The size of each version in kilobytes
- Mod Time — The time the version was last modified
- Backup Time — The time the version was backed up
- Location — The volume location of the version

3. Select a version, then click one of the following buttons:
 - Change Browse Time — Changes the *browse time* to the backup time of the selected version. The new browse time is reflected in the contents of the Recover window, and indicated in the status bar when you click OK.
 - Mark — Marks the selected item for recovery without changing the browse time.
 - Unmark — Removes the mark from an item that has been marked for recovery.
4. Click OK.

Task 6: View the Required Backup Volumes (Optional)

Note: This feature is *not* supported for snapshot recoveries.

Use the Required Volumes feature to determine which backup volumes to mount for the NetWorker Module to complete a recovery. This can be useful when:

- You have changed the browse time.
- You are restoring a large backup that used multiple volumes.

The backup level used for the recovery determines which volumes the NetWorker software must access. [Table 14 on page 92](#) shows the volumes required for each backup level.

Table 14. Volumes Required for Each Backup Level

Backup Level	Requires All Volumes Containing These Backups
Full	The full backup
Copy	The copy backup
Incremental	<ul style="list-style-type: none"> • The full backup immediately preceding the incremental backup being recovered • All incremental backups that occurred between the full backup and the incremental backup being recovered
Differential	<ul style="list-style-type: none"> • The full backup immediately preceding the differential backup being recovered • The differential backup being recovered

To view the required volumes:

1. In the Recover window, mark each object you want to recover. For instructions, see ["Task 3: Set Up the Recovery" on page 86](#).
2. Select Required Volumes from the View menu. The Required Volumes dialog box appears with a list of the volumes required to perform the recovery.

Note: If a required backup volume is currently mounted on a NetWorker server storage device, the device name appears after the volume name. If a required backup volume is not mounted, do one of the following:

- Contact the NetWorker administrator and request that the volume be mounted.
- Wait for the NetWorker software to prompt the administrator to mount the volume.

Task 7: Set the Recovery Options

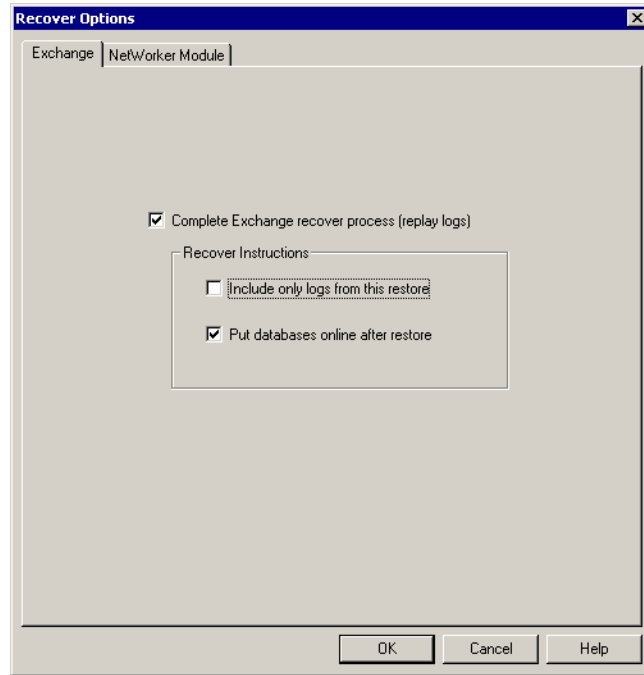
The NetWorker Module provides a number of options that can be set for each recovery. Before starting a recovery, review the option settings and make any necessary changes.

Note: Settings in the Recover Options dialog box persist only until you close the Recover window. Each time you open the Recover window, be sure to check the options settings to ensure they are appropriate for the next recovery.

To view or change the recovery options:

1. While the Recover window is displayed, select Recover Options from the Options menu. For more information, see "[Task 3: Set Up the Recovery](#)" on [page 86](#).
2. On the Exchange tab of the Recover Options dialog box ([Figure 20 on page 94](#)), specify how the Exchange server behaves after the NetWorker Module has restored one or more Exchange databases.

Figure 20. Recover Options Dialog Box: Exchange Tab



- Complete Exchange recover process (replay logs) — (This option pertains to traditional recoveries only, and is not displayed in the snapshot Recover window.) Clear this check box if you want to recover databases and log files, but you do *not* want the Exchange server to replay the log files. If you clear this check box, you must manually run the **eseutil** Microsoft Exchange Server utility on the storage group to replay the log files and complete the recovery operation. This option is selected by default.

Note: Most Exchange administrators will never need to clear this check box to inhibit the Exchange recover process, since the NetWorker Module automatically enumerates and restores all of the files needed for the Exchange Server recovery. This is considered an advanced option, and you should only use it if you have experience with the **eseutil** utility.

For more information on using the **eseutil** Exchange Server utility to replay log files, refer to the following Microsoft Knowledge Base articles:

- Article 232938, *The "Last Backup Set" Check Box and Hard Recovery in Exchange*
- Article 298901, *Restoring a Database in a Storage Group Without Replaying Subsequent Log Files.*

Information on the **eseutil** utility is also available in the Microsoft Documentation.

- Include only logs from this restore — Select this option if you want to restore the data to its state at the time of the backup. If this option is selected, the Exchange server replays only the restored log files. Log files that were created after the backup are not replayed.

If this option is *not* selected, the Exchange server replays all recovered log files, and then replays any log files that were created after the backup. This minimizes the loss of transactions that occurred after the backup.

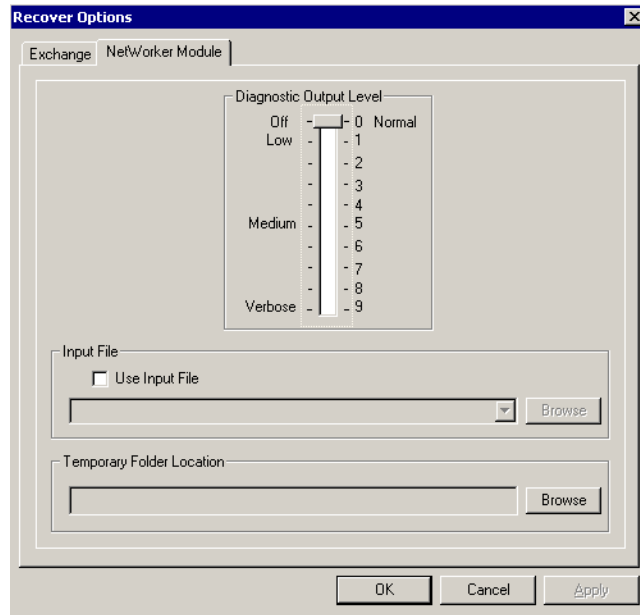
Note: For snapshot recovery, this option causes existing log files to be deleted. This is the default for directed recovery of a snapshot backup.

- Put databases online after restore — Select this option if you want the Exchange server to mount the databases automatically after the recovery. Select this option only when no further integrity checking or other work is required before bringing the recovered databases online.

If this option is *not* selected, the Exchange server does not mount the recovered databases and they must be brought online manually.

- On the NetWorker Module tab of the Recover Options dialog box (Figure 21 on page 96), specify how the NetWorker Module behaves during the recovery.

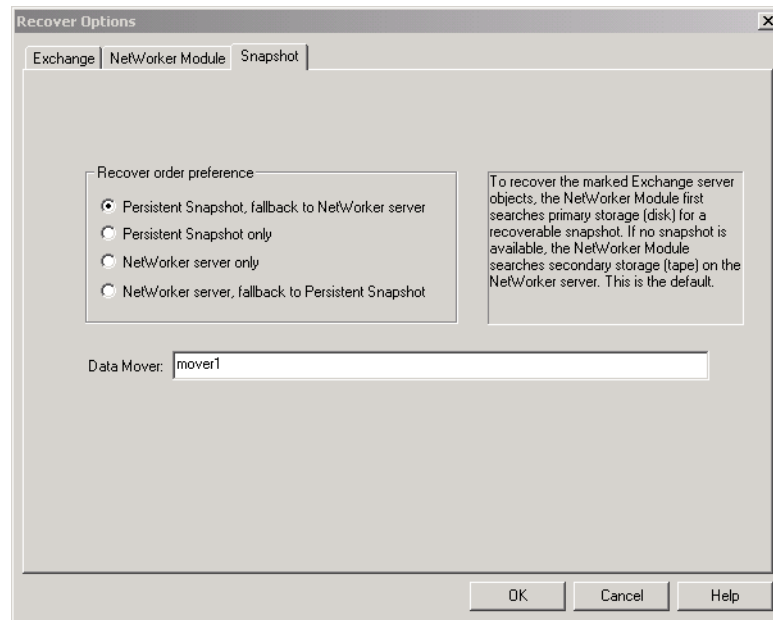
Figure 21. Recover Options Dialog Box: NetWorker Module Tab



- Diagnostic Output Level — Determines the amount of detail that appears in the Recover Status window and is written to the `<NetWorker_install_path>\applogs\nsrxchrc.log` file. In general, set this level above zero only when troubleshooting or closely monitoring a recovery. Diagnostic output levels above zero are intended primarily for use by NetWorker Technical Support. The diagnostic messages are not documented.
- Input File — Specify the path and filename for an input file that lists the Exchange objects to recover. Using an input file is an alternative to marking objects for recovery. For more information, see ["Using Input and Exclude Files to Specify Objects for Backup"](#) on page 110.
- Temporary Folder Location — Specify the directory location where the NetWorker Module writes temporary files during mailbox and PowerSnap Module recoveries. By default, the `<NetWorker_install_path>\tmp` directory is used. Temporary files are written to this location for *brick-level* mailbox operations only. A temporary folder location is not required for other types of recovery, such as a storage group or database recovery.

4. The Snapshot tab of the Recover Options dialog box (Figure 22 on page 97) is available only if all Exchange databases and log files reside on a snapshot-capable storage subsystem, and the appropriate PowerSnap Module is installed. On the Snapshot tab, you can specify how the NetWorker Module behaves during a snapshot recovery.

Figure 22. Recover Options Dialog Box: Snapshot Tab



- Exchange Store (file level) — To recover a snapshot of one or more Exchange objects, select one of the following options:
 - Persistent Snapshot, Fallback to NetWorker server — The default. If a recoverable snapshot exists on an Exchange server storage subsystem, recover it; if not, search secondary storage on the NetWorker server or storage node for a recoverable snapshot.
 - Persistent Snapshot Only — If a recoverable snapshot exists on an Exchange server storage subsystem, recover it; otherwise do not perform a recovery.

- NetWorker Server Only — If a recoverable snapshot exists on secondary storage on the NetWorker server or storage node, recover it; otherwise do not perform a recovery.
- NetWorker Server, Fallback to Persistent Snapshot — If a recoverable snapshot exists on secondary storage on the NetWorker server or storage node, recover it; if not, search the Exchange server's storage subsystem for a recoverable snapshot.
- Data Mover — This text box identifies the hostname of the computer that restores the snapshot.
By default, this value is set as follows:
 - For snapshot recovery to the local host, the Exchange server's hostname is specified as the data mover.
 - For a directed recovery of a snapshot, the hostname of the source client is specified as the data mover.



Important: If a data mover other than the target Exchange server was specified for the snapshot backup, the same data mover must be specified for snapshot recovery.

For more information about configuring a data mover, refer to the appropriate *NetWorker PowerSnap Module Installation and Administrator's Guide*.

Task 8: Start the Recovery

To start a recovery:

1. If recovering one or more Exchange databases, ensure that each database is set to allow recovery. For instructions, see "[Task 2: Set Exchange Database Properties to Allow Restore](#)" on page 84.
2. Ensure that any necessary optional tasks have been completed, and the correct Exchange objects are marked for recovery. For instructions, see "[Task 3: Set Up the Recovery](#)" on page 86.
3. Ensure that the recovery options are set correctly. For instructions, see "[Task 7: Set the Recovery Options](#)" on page 93.

4. Click the Start button. The Recover window is replaced by the Recovery Status window, which displays messages so you can monitor the progress.
5. To cancel a recovery after it is started, select End Recover from the File menu.

Note: If the recovery fails to start, or you encounter other problems, see ["Chapter 8: Troubleshooting" on page 141](#).

Task 9: Verify the Recovery

To verify recovery of the Exchange objects:

1. Log on to the Exchange recovery server host by using a Windows account with Exchange Server permissions.
2. If you did not select the "Put databases online after restore" option, use the Exchange System Manager to put the databases online now. For more information about the "Put databases online after restore" option, see ["Task 7: Set the Recovery Options" on page 93](#).
3. Verify that the recovered Exchange database appears in the Exchange Server System Manager directory tree.

Recovering the KMS and SRS Databases

The KMS does not provide an automated way to take a database offline prior to performing a recovery. It also requires the user to provide a password whenever the KMS service is started. For these reasons, the KMS recovery process requires more manual steps than the recovery process for Exchange or SRS databases.

KMS recovery also requires that Active Directory contain the user accounts of administrators who have full permission to manage the KMS. If the Active Directory containing the KMS administrator accounts is lost or damaged, it must be recovered before you can recover the KMS.

How to Recover the KMS Database

To recover the KMS database:

1. Verify that the required KMS administrator accounts exist in the Active Directory. Restore the Active Directory if necessary.
2. Stop the KMS service (**MSExchangeKMS**).
3. When the KMS service is stopped, move any existing KMS files from the KMS installation folder (**KMSDATA**) to a temporary folder.
4. Start the KMS service. Verify that it is ready for a recovery by making sure the application event log shows the following error message:

```
KMS cannot mount the key database. Either the database is missing or it is corrupted. The service started, but Admin/User cannot do any operation except restoring the database from a backup set. After restoring, please stop and restart the service.
```

5. Start the NetWorker User for Exchange Server program.
6. From the Operations menu, select Recover, and then select Traditional.
7. In the Recover window, mark the version of the KMS database to recover.
8. Click Start to begin the recovery.
9. When the recovery is complete, stop and restart the KMS service.
10. Delete the files you saved to the temporary folder.

How to Recover the SRS Database

To recover the SRS database:

1. Log on to the Exchange server with sufficient permissions to recover the SRS database. For more information, refer to the Microsoft Exchange Server documentation.
2. In the NetWorker User for Exchange Server program, select Recover from the Operations menu, and then select Traditional.
3. In the Recover window, mark the SRS database to recover.
4. Click Start to begin the recovery.
5. If the "Put databases online after restore" recovery option was *not* selected, restart the Site Replication Service after the recovery is finished.

Directed Recovery

In the event of a problem recovering to the original Exchange server host, such as a disk drive failure, you can perform a directed recovery to recover Exchange data to a different Exchange server.

To replicate an Exchange database on recovery server, the following conditions must be met:

- The recovery server must be in a different Active Directory forest than the original Exchange server.
- Storage group and database names must match exactly.
- The recovery server must be configured with the same organization name and administrative group name as the original Exchange server.

Directed Recovery of Snapshot Backups

To perform a directed recovery of a snapshot backup, the recovery server may use the same storage array as the original Exchange server, or a different storage array. The directed recovery procedure is identical for instant backups and snapshots that have been moved to secondary storage on the NetWorker server or storage node.

Note: This NetWorker Module supports recovery of snapshot backups to an Exchange server that does not have a snapshot-capable storage subsystem. In that case, the target Exchange server must have the PowerSnap Module software installed. For instructions on installing PowerSnap Module software, refer to the appropriate *NetWorker PowerSnap Module Installation and Administrator's Guide*.



Important: Before beginning a directed recovery of a snapshot backup, perform the following procedure to ensure the storage group log file prefix on the recovery server matches the log file prefix on the original Exchange server at the time of the backup. Exchange server assigns the next available prefix when a storage group is created, so the prefix on the recovery server might not match the prefix on the original server.

How to Ensure the Recovery Server Log File Prefix Matches the Original

To ensure the log file prefix on the recovery server matches the original Exchange server:

1. Using the Exchange System Manager, display the properties of the storage group on the original Exchange server. Make a note of the log file prefix.
2. On the recovery server, check each storage group's properties to determine whether the required log file prefix is in use. If the prefix is in use, delete the storage group that is using it.
3. Create an empty storage group on the recovery server. Exchange assigns the next available log file prefix. Use the same drive letter and paths for the transaction log location and system path location that were used on the original Exchange server.
4. If the new storage group prefix does not match the original, use an ADSI editor (for example, **adsvw.exe**, the Active Directory browser) to edit the *msExchESEParamBaseName* property of the storage group.
5. Create all required databases in the new storage group. Use the same names as the original databases, and the same paths for the *.edb* and *.stm* files.
Note: Do not mount the databases.
6. For each database created in the previous step, set the "Database can be overwritten by a restore" option. For instructions, see ["Task 2: Set Exchange Database Properties to Allow Restore" on page 84](#)
7. Perform the directed recovery. For instructions, see ["How to Perform a Directed Recovery" on page 103](#).

Access Requirements for Directed Recovery

For security reasons, directed recovery is a restricted NetWorker function, available only to users with sufficient privileges. NetWorker administrators are automatically granted the necessary privileges, however, most users cannot perform a directed recovery.

Access requirements for directed recovery are as follows:

- The user must have Remote Access All Clients privilege.
- The hostname of the NetWorker client used to administer the directed recovery must be listed in the servers file of each NetWorker client computer that is designated as a potential destination client.

- The `user@destination_client_hostname` must be listed in the source client's Remote Access list and must have at least the Recover Local Data privilege. (Users in the Administrators group on the NetWorker server are automatically granted the necessary privileges.)
- When working with NetWorker server software earlier than release 7.0, the user must be a NetWorker administrator.
- To perform a directed recovery of a snapshot backup:
 - The NetWorker `servers` file on the data mover node (proxy client) must contain an entry for the destination client.
 - The NetWorker Administrators Users group must include `system@destination_client_hostname` (using the fully qualified domain name).

For complete information about the access requirements, and instructions for making any necessary configuration changes on the NetWorker server or client, refer to the directed recovery documentation in the *NetWorker Administrator's Guide*.

How to Perform a Directed Recovery

To recover Exchange data to a recovery server:

1. Log on to the recovery server with sufficient privileges to perform a directed recovery (see ["Access Requirements for Directed Recovery" on page 102](#)).
2. To recover an Exchange database that does not exist on the recovery server, you must manually create it. The database name must *exactly* match the name of the database to be recovered. For instructions, refer to the Microsoft Exchange Server documentation.
3. Start the Exchange System Manager program. In the Database Properties dialog box, select "The database can be overwritten by a restore." For more information, see ["Task 2: Set Exchange Database Properties to Allow Restore" on page 84](#).

4. In the NetWorker User for Exchange Server program, select Directed Recover from the Operations menu, and select one of the following from the submenu:
 - Snapshot — Recover an instant backup from the original Exchange server's primary storage subsystem, if available. If a recoverable snapshot backup is not available on primary storage, search for a recoverable snapshot on secondary storage on the NetWorker server or storage node.
 - Traditional — Recover a traditional backup of the original Exchange server's data.
5. In the Source Client dialog box, select the hostname of the original Exchange server, and click OK.
6. In the Recover window, mark the Exchange objects to recover. For more information, see ["Task 3: Set Up the Recovery" on page 86](#).
7. Set the recover options, as necessary. For instructions, see ["Task 7: Set the Recovery Options" on page 93](#).

Note: For directed recovery of a snapshot backup, you must specify the "Replay only logs from this restore" option on the Exchange tab, and specify the hostname of the data mover in the Data Mover text box of the Snapshot tab. These are the default settings for these options when you set up a directed recovery of a snapshot backup.

8. Click the Start button on the toolbar.

The Recover Status window replaces the Recover window so you can monitor the recovery.

To cancel the recovery, select End Recover from the File menu.

Replaying Transaction Logs

After Exchange server files are restored, the Exchange software may take a long time to replay the transaction logs. The time required to replay the logs depends on the following:

- System configuration
- Exchange server parameters
- Number of logs restored

You can monitor transaction log progress with the Windows Event Viewer. The following message appears while the transaction logs are replaying:

```
The database engine is replaying log file exxxxxxxx.log
where:
```

xx is the storage group number, starting with 00

xxxxxx is a five-digit hexadecimal number

If there is a gap in the log file sequence, the Exchange server cannot replay any existing or restored logs. This causes the following error in the NetWorker Module:

```
Log file gap detected. Max recovered log: exxxxxxxx.log
```

This situation can occur in various ways, for example, when a file system recovery that restores some log files is performed prior to recovery of Exchange databases. When the NetWorker Module detects a log file gap, it replays only recovered logs to prevent such an error.

Chapter 5: Mailbox and Public Folder Operations

This chapter addresses special considerations for backup and recovery operations for mailboxes and public folders. It includes the following sections:

- ["Permission Requirements" on page 107](#)
- ["Tips for Backing Up Mailboxes and Public Folders" on page 108](#)
- ["Mailbox Names" on page 108](#)
- ["Using Wildcard Characters to Specify Mailboxes for Backup" on page 110](#)
- ["Using Input and Exclude Files to Specify Objects for Backup" on page 110](#)
- ["Backing Up Disabled and Disconnected Mailboxes" on page 114](#)
- ["Recovering Mailboxes and Public Folders" on page 115](#)
- ["Directed Recovery of a Mailbox or Public Folder from a Database Backup" on page 117](#)

Permission Requirements

To back up or recover a mailbox or public folder, the Windows domain account you use to log on to the NetWorker server host must be a member of the Exchange Administrators group. Also, the account must have the following server or database permissions enabled in the Exchange System Manager:

- List contents
- Read properties
- Administer Information Store
- View Information Store status
- Receive as
- Send as

Tips for Backing Up Mailboxes and Public Folders

Consider the following when planning mailbox and public folder backups:

- Because a mailbox or public folder backup includes all attributes of each individual item the mailbox or public folder contains, backing up a large number of individual mailboxes or public folders can take much longer, and require more disk space, than backing up the IS or any particular database. The Exchange server must have sufficient space to accommodate temporary files that the NetWorker Module software creates during the backup.
- Microsoft Exchange Server does not actually create a mailbox until the user logs on to the mailbox with an e-mail client program, or the mailbox receives an e-mail message. To ensure that a mailbox exists and can be backed up, verify that the mailbox is visible in the Exchange System Manager program. For instructions, refer to the Microsoft Exchange Server documentation.
- Mailboxes and public folders can be backed up only at level full. This increases the time required for backup operations, but is necessary to ensure reliable recovery.
- IS objects, such as a storage group or database, cannot be rebuilt by recovering backups of their constituent mailboxes and public folders.

Mailbox Names

The NetWorker Module for Exchange Server uses two different mailbox naming conventions:

- Full Name convention, for internal mailbox representation.
- Display Name convention, for displaying mailbox names in the NetWorker User for Exchange Server program.

Either convention can be used for mailbox backup and recovery operations, and both conventions can be used in input and exclude files. Both conventions also support the use of the wildcard asterisk character (see ["Using Wildcard Characters to Specify Mailboxes for Backup" on page 110](#)).

For example, to back up a mailbox for user *John Doe* (user name *jdoe*), any of the following are acceptable:

```
MSEXCH:MB/John Doe/
MSEXCH:MB/Joh* /
MSEXCH:MB/%2FO=DOMAIN_NAME ORGANIZATION%2F
OU=GROUP_NAME%2FCN=RECIPIENTS%2FCN=JDOE/
MSEXCH:MB/%2FO=DOMAIN_NAME ORGANIZATION%2F
OU=GROUP_NAME%2FCN=RECIPIENTS%2FCN=JDO* /
```

To back up the inbox for user *John Doe* (user name *jdoe*), either of the following are acceptable:

```
MSEXCH:MB/John Doe/Inbox/
MSEXCH:MB/%2FO=DOMAIN_NAME ORGANIZATION%2F
OU=GROUP_NAME%2FCN=RECIPIENTS%2FCN=JDOE/Inbox/
```

Note: The NetWorker software uses slashes (/) to indicate directory breaks. Since full names include slashes, you must replace each slash in a full name with %2F when typing it so that the NetWorker software can distinguish it from a directory break.

Full Name Convention

The Full Name convention is known in Active Directory (AD) as **legacyExchangeDN** and in the Microsoft Messaging API (MAPI) as **PR_EMAIL_ADDRESS**. Use of the Full Name convention can be seen in the Full Mailbox Directory Name column when viewing mailboxes in the Backup and Recover windows, and also in the log files. The NetWorker Module uses this naming convention internally because it is unique (only one can be active at a time), and because the names are 7-bit ASCII, which helps to eliminate I18N/L10N problems. For example, the full name for user *John Doe* (user name *jdoe*) is:

```
/O=DOMAIN_NAME ORGANIZATION/OU=GROUP_NAME/
CN=RECIPIENTS/CN=JDOE
```

Display Name Convention

The Display Name convention is known in AD as **displayName** and in MAPI as **PR_DISPLAY_NAME**. In prior releases, the NetWorker Module used the AD **cn** name when displaying mailbox names. The display name will usually be the same as the **cn** name, but not always. Users who have set them in AD such that they do not match will see a difference in release 4.1.

Using Wildcard Characters to Specify Mailboxes for Backup

When specifying mailboxes to back up, an asterisk (*) as the last character in a mailbox name is recognized by the NetWorker Module as a wildcard.

Asterisks can be used in the following situations:

- When specifying a mailbox to back up by using the **nsrxchsv** backup command at the command prompt, or in the Backup Command attribute of the Exchange server's Client resource on the NetWorker server. For example, to back up all mailboxes whose name begins with *D*, enter:

```
nsrxchsv "MSEXCH:MB/D*"
```

- When specifying a mailbox to back up by using the **MSEXCH:MB** save set in the Save Set attribute of the Exchange server's Client resource on the NetWorker server. For example, to back up all mailboxes whose name begins with *Dig*, enter:

```
MSEXCH:MB/Dig*
```

- When specifying a mailbox within an input or exclude file. For example, if creating an input file to back up all mailboxes whose name begins with *Pe*, enter:

```
MSEXCH:MB/Pe*
```

5

Using Input and Exclude Files to Specify Objects for Backup

To configure a scheduled backup of a large number of individual Exchange objects, such as multiple mailboxes or private folders, you can use input and exclude files. You can also use input and exclude files when running a manual backup from the command prompt.

- With an input file, the **-I *input_file*** option causes the backup command to read the input file to determine which objects to back up.
- With an exclude file, the **-X *exclude_file*** option causes the backup command to read the exclude file to determine which objects *not* to back up.

While include files can be used in backup and recovery operations, exclude files can only be used in backup operations.



Important: If the `-I input_file` option is used, only the save sets specified in the input file are processed. Save sets specified individually on the command line are ignored. If the `-I input-file` option is not used, save sets specified individually on the command line are processed.

To use an input and/or exclude file during a scheduled backup, perform the following tasks:

- "Task 1: Create the Input or Exclude File" on page 111
- "Task 2: Specify the Input and/or Exclude File in the Client Resource" on page 113

Task 1: Create the Input or Exclude File

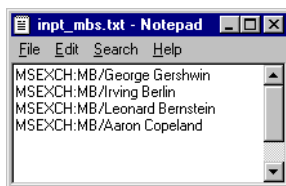
Input and exclude files can be created either manually or automatically.

How to Create an Input or Exclude File Manually

To create an input or exclude file manually:

1. Using a text editor, create an ASCII file that contains a list of objects to back up (input file), or a list of objects to exclude (exclude file) from backup. Specify each object on a separate line, as shown in [Figure 23 on page 111](#).

Figure 23. Mailbox Names in Input or Exclude File



2. Save the file to the path for NetWorker executables, which was specified when the NetWorker client software was installed.

Note: For information about the NetWorker installation path, refer to the *NetWorker Module for Microsoft Exchange Server Installation Guide*.

How to Create an Input or Exclude File Automatically

When the NetWorker User for Exchange Server program performs a manual backup or a recovery operation, a list of the marked objects is automatically written to `<NetWorker_install_path>\tmp\NME_Marked_Items.txt`. This file is in a format that is suitable for use as either an input or exclude file.

Note: Each successive manual backup or recovery overwrites this file.

To create an input or exclude file automatically:

1. Using the NetWorker User for Exchange Server program, perform a backup or recovery operation that includes the Exchange objects to include in the input or exclude file. For instructions, see ["Performing a Manual Backup" on page 38](#) or ["Performing a Recovery" on page 83](#).
2. Copy the resulting `NME_Marked_Items.txt` file to a permanent location and rename it. It is recommended that you place the file in the `<NetWorker_install_path>\bin` directory.
3. In the NetWorker Administrator program, specify the input or exclude filename in the client's Backup Command attribute. For more information, see ["Client Attribute Settings" on page 56](#).

Notes:

- The maximum number of characters allowed in the Backup Command attribute is 64. Consider this restriction when choosing a name for an input or exclude file.
- If the file is not located in the `<NetWorker_install_path>\bin` directory, be sure to include the full pathname in the Backup Command attribute by using double backslashes (`\\`). For an example, see [Figure 24 on page 114](#).

Task 2: Specify the Input and/or Exclude File in the Client Resource

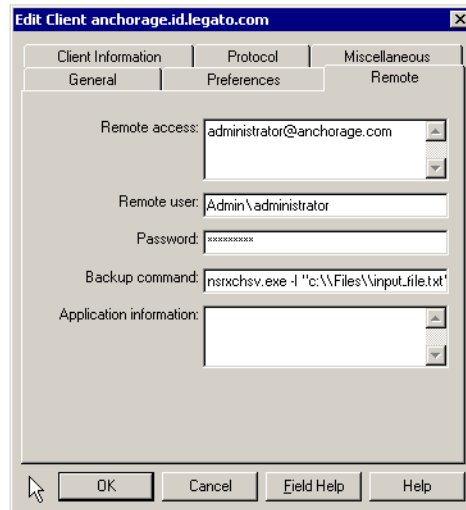
Using the NetWorker Administrator program, edit the Exchange server's Client resource as follows:

- If the input or exclude file is in the default directory (`<NetWorker_install_path>\bin`), enter the backup command, the command option, and the name of the file. For example:
 - To use an input file:
nsrxchsv.exe -I *input_file*
 - To use an exclude file:
nsrxchsv.exe -X *exclude_file*
 - To use both an input and exclude file:
nsrxchsv.exe [-I *input_file*][-X *exclude_file*]
- If the input or exclude file is located in a directory other than the default, enter the backup command, the command option, and the full path to the file, by using quotation marks and double backslashes. For example:
 - To use an input file:
nsrxchsv.exe -I "C:*my_folderinput_file.txt*"**
 - To use an exclude file:
nsrxchsv.exe -X "C:*my_folderexclude_file.txt*"**
 - To use both an input and exclude file:
nsrxchsv.exe [-I "C:*my_folderinput_file.txt*"][-X "C:*my_folder**exclude_file.txt*"]**

Note: If using both an input and exclude file, and a mailbox name appears in both files, the exclude file takes precedence and the mailbox is *not* backed up.

The example in [Figure 24 on page 114](#) shows the Edit Client dialog box for a NetWorker server running on Windows. If your NetWorker server is running on a different OS, the dialog box will look somewhat different.

Figure 24. Specifying an Input or Exclude File



Backing Up Disabled and Disconnected Mailboxes

5

Disabled mailboxes can be backed up if they are properly configured, and if certain conditions apply. For example, it is possible to back up a mailbox on a local Exchange Server if it is associated with a user whose account is in a different AD forest. In this scenario, a disabled user is created in the local AD for the mailbox. For detailed information on this scenario, refer to the following Microsoft Knowledge Base articles:

- [Article 278888, How to Associate an Exchange 2000 Mailbox or an Exchange 2003 Mailbox with a Windows NT 4.0 Account](#)
- [Article 322890, How to Associate an External Account with an Existing Exchange 2000 Mailbox](#)

In another scenario, an employee leaves the company and a system administrator disables the account in Active Directory Users and Computers. If a mailbox backup is attempted with NetWorker Module for Exchange, the Exchange server refuses to give the NetWorker Module access to the mailbox. To restore the mailbox to a properly configured state, Microsoft recommends assigning the ID **SELF** to the **msExchMasterAccountSID** property in AD for the disabled user. This simulates the remote-forest user scenario described

earlier, and allows a privileged user access to back up the mailbox. For instructions on how to perform this procedure, refer to Microsoft Knowledge Base article 278966, *Unable to Move or Log On to Exchange Resource Mailbox*.

This procedure can also be performed on mailboxes that have been disconnected. Before beginning, however, you must first reconnect the mailbox to an account. You can then disable the account in Active Directory Users and Computers (if security is a concern), assign the ID **SELF**, and proceed with the backup.

Recovering Mailboxes and Public Folders

This section describes methods for recovering mailboxes, public folders, and the individual items they contain.

Note: When an Exchange user has mail delivered to personal folders on a client computer, the user is responsible for the recovery. The user can recover the personal folders and Personal Address Book from a file system backup if these items were stored on a mapped server drive. If the user has not performed any local backups, and no fileservers backups are available, the user's data is lost.

Deleted Item Retention

Exchange administrators can set a Deleted Item Retention period to determine how long to retain items on the Exchange server after they are deleted from the *Deleted Items* folder. Within the retention period, a user with the necessary permissions can use the Exchange server to recover such items. For instructions on setting a retention period, and recovering deleted items, refer to the Microsoft Exchange Server documentation.

Note: By default, the Deleted Item Retention period applies only to items that have been deleted from the *Deleted Items* folder; it does not apply to items that have been "permanently" deleted from other folders by pressing Shift+Delete. For information on enabling the Deleted Item Retention feature for *all* folders, refer to Microsoft Knowledge Base article 178630, *XADM: How to Recover Items That Do Not Touch the Deleted Items Folder*.

Recovering Mailboxes and Public Folders

To recover a mailbox, public folder, or individual item in a mailbox or public folder, see ["Performing a Recovery" on page 83](#).

When recovering mailboxes, the NetWorker Module creates a special recovery folder within the original mailbox. The folder name consists of the date and time of the recovery and the words *Recovered Items*. A separate Recovered Items folder is created in each mailbox that is recovered. In the Recovered Items folder, the hierarchy of folders and messages in the original mailbox is preserved.

Note: After the recovery, move the recovered items to a different folder and then delete the *Recovered Items* folder.

How to Set Permissions for Public Folder Recoveries

To recover individual items from public folders, you must have the proper Exchange permissions. This is the case for public folders, such as the *Internet Newsgroups* folder, created during the Exchange server installation.

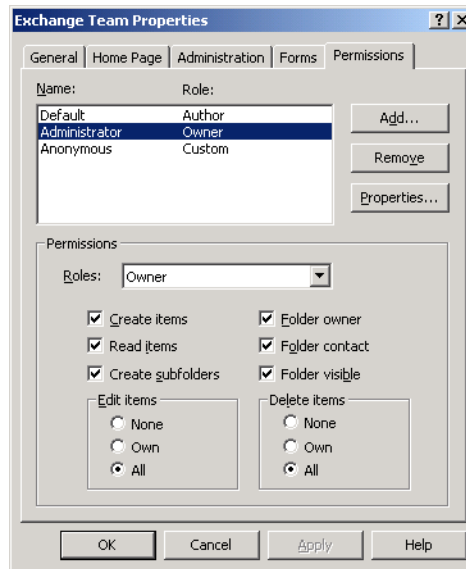
To set the permissions for items in a public folder:

1. Start the Exchange System Manager.
2. Open the Properties dialog box for the public folder, as shown in [Figure 25 on page 117](#).

3. On the Permissions tab, select the following permissions and click OK:

- Create Items
- Read Items
- Create Subfolders

Figure 25. Public Folder Properties Dialog Box: Permissions Tab



Directed Recovery of a Mailbox or Public Folder from a Database Backup

The easiest way to recover an individual user's mailbox or a directory in a public folder is through the recovery of a mailbox or public folder save set. If these are not available, you can recover a mailbox or public folder from a database backup. To recover these items from a database backup of Exchange Server 2003, use the RSG recovery method. For more information, see ["Microsoft Exchange 2003 Recovery Storage Group" on page 79](#). To recover these items from a database backup of Exchange 2000 Server, you must first recover the database to a recovery server (an Exchange server or virtual server other than the Exchange server from which the database was backed up). For instructions, see ["Directed Recovery" on page 101](#). The *directed recovery* method can also be used with Exchange Server 2003.

In the following procedures, the *production server* is the original Exchange server host. The *recovery server* is the host computer or virtual server to which you plan to recover the object.

After you recover the user mailbox to the recovery server, you must merge the recovered mailbox with the user's mailbox on the production server.

System Requirements

To set up the recovery server, configure a Microsoft Exchange Server host that is identical to the original production Exchange server host.



Important: All software versions and service packs on the production server and recovery server must match those in use at the time the backup was made. For detailed system requirements, refer to the *NetWorker Module for Microsoft Exchange Server Installation Guide*.

Make sure the recovery server has sufficient disk space for the temporary files and the restored Exchange data files. The amount of disk space required varies with the database sizes.

5

How to Prepare the NetWorker Server for the Recovery

To prepare the NetWorker server host for the recovery:

1. Start the NetWorker Administrator program.
2. Create a Client resource for the recovery server, if one does not already exist. For more information, see "[Task 3: Configure One or More Client Resources](#)" on page 55.
3. In the Remote Access attribute of the Client resource for the production server, add:

Administrator@recovery_server_name

For more information about NetWorker resources and resource attributes, refer to the *NetWorker Administrator's Guide*.

How to Recover a Mailbox from a Database Backup

This procedure assumes:

- The user's mailbox was deleted and purged.
- The user account was not removed from the Active Directory.

Note: If the user account has been removed from the Active Directory, you must create a new user account and mailbox using the original name. For instructions, refer to the Microsoft documentation.

To recover a mailbox:

1. Create a target database on the recovery server with the same name as the database being recovered.
Note: The names of the storage group and database on the recovery server must *exactly* match the names on the production server.
2. Set the database properties to allow the restored data to overwrite the database. For instructions, see ["Task 2: Set Exchange Database Properties to Allow Restore" on page 84](#).
3. On the recovery server, start the NetWorker User for Exchange Server program.
4. Select Directed Recover from the Operations menu, and select one of the following from the submenu:
 - Snapshot — Recover an instant backup from the original Exchange server's primary storage subsystem, if available. If a recoverable snapshot backup is not available on primary storage, search for a recoverable snapshot on secondary storage on the NetWorker server or storage node.
 - Traditional — Recover a traditional backup of the original Exchange server's data.
5. In the Source Client dialog box, select the hostname of the original production server, and click OK.
6. Mark the database to recover.
7. Click Start.
8. After the recovery is finished, start the Exchange System Manager program.
9. Ensure the recovered database is online.

10. Right-click the database and select Run Cleanup Agent. A red mark beside the mailbox name indicates it is not attached to an Active Directory user.
11. Right-click the desired mailbox and select Reconnect.
12. Specify the name of an existing Active Directory user account that corresponds to the mailbox.
13. Run the Exchange Active Directory Users and Computers program.
14. Right-click the user name and select Exchange Tasks.
15. Select the Move Mailbox option and follow the wizard to specify the target server and mailbox store. This moves the mailbox from the database on the recovery server to the database on the production server.

How to Recover a Public Folder from a Database Backup

To recover a public folder:

1. Create the target database on the recovery server with the same name as the database being recovered.
Note: The names of the storage group and database on the recovery server must *exactly* match the names on the production server.
2. Set the database properties to allow the restored data to overwrite the database. For instructions, see ["Task 2: Set Exchange Database Properties to Allow Restore" on page 84](#).
3. On the recovery server, start the NetWorker User for Exchange Server program.
4. Select Directed Recover from the Operations menu, and select one of the following from the submenu:
 - Snapshot — Recover an instant backup from the original Exchange server's primary storage subsystem, if available. If a recoverable snapshot backup is not available on primary storage, search for a recoverable snapshot on secondary storage on the NetWorker server or storage node.
 - Traditional — Recover a traditional backup of the original Exchange server's data.
5. In the Source Client dialog box, select the hostname of the original production server, and click OK.
6. Mark the database to recover.
7. Click Start.

8. After the recovery is finished, start the Exchange System Manager program.
9. Ensure the recovered database is online.
10. On the recovery server, move the public folder back to the production server by using one of the following methods:
 - Use Microsoft Outlook to export the folder to a *.pst* file, then on the production server import the *.pst* file. For more information, refer to the Microsoft Outlook documentation.
 - Use the Microsoft Exchange System Manager to replicate the folder contents back to the production server. For more information, refer to the Microsoft Exchange documentation.

Chapter 6: Backup and Recovery in a Microsoft Cluster

This chapter explains how to use the NetWorker Module for Exchange Server in a Microsoft Cluster Server environment. It includes the following sections:

- ["Using the NetWorker Module in a Microsoft Cluster" on page 123](#)
- ["Scheduled Backups in a Microsoft Cluster" on page 125](#)
- ["Manual Backups in a Microsoft Cluster" on page 127](#)
- ["Recovering an Exchange Server Database in a Cluster" on page 130](#)

Note: For this chapter, familiarity with Microsoft clusters is assumed. For detailed instructions on performing cluster administration, refer to the Microsoft documentation.



Important: To use this NetWorker Module in a Microsoft cluster, the NetWorker client and NetWorker Module software must be installed and configured for cluster operations. For instructions, refer to the *NetWorker Module for Microsoft Exchange Server Installation Guide*.

Using the NetWorker Module in a Microsoft Cluster

This NetWorker Module supports traditional backup and recovery of Exchange server clusters on the following platforms:

- Microsoft Exchange 2000 Server on Windows 2000 Server
- Microsoft Exchange 2003 Server on Windows 2000 Server
- Microsoft Exchange 2003 Server on Windows Server 2003

For detailed system requirements, refer to the *NetWorker Module for Microsoft Exchange Server Installation Guide*.

For information about installing and configuring PowerSnap Module software in a Microsoft cluster, refer to the appropriate *NetWorker PowerSnap Module Installation and Administrator's Guide*.

Note: If a failover occurs, or a group goes offline during a backup or recovery, the operation is terminated immediately. Restart the operation when the virtual server comes back online.

How to Configure the NetWorker Administrators Users Group

For NetWorker release 7.0 and later, add the following to the NetWorker Administrators Users Group for each physical node:

LocalSystem@physicalnode_hostname

where *physicalnode_hostname* is the fully qualified domain name.

For any physical node that is configured to use a Backup account (in the Remote User and Password attributes of the Client resource), add the following to the NetWorker Administrators Users Group:

User_Name@physicalnode_hostname

where *physicalnode_hostname* is the fully qualified domain name.

For instructions on configuring the NetWorker Administrators Users Group, refer to the *NetWorker Administrator's Guide*.

How to Configure the NetWorker Servers File

When you install the NetWorker software, you are prompted to enter the hostnames of the NetWorker servers authorized to access the computer's data for backup and recovery. The list of authorized servers is stored in the `<NetWorker_install_path>\res\servers` file on the NetWorker client.

To perform *snapshot* backups in a Microsoft cluster, the *servers* file on each cluster node must either contain the hostnames of all nodes in the cluster, or be blank (contain no hostnames). This does not apply to *traditional* backup operations, which do not require that cluster nodes be listed in the *servers* file.



Important: If a NetWorker client's *servers* file does not contain any hostnames, then *any* NetWorker server can access the client's data for backup and recovery. This could be a potential security risk.

To edit the servers file:

1. On the Exchange server host, stop following services:
 - NetWorker Remote Exec Service
 - NetWorker PowerSnap Service
2. Using a text editor, add the hostname of each node in the cluster to the `<NetWorker_install_path>\res\servers` file.
3. Start the services that were stopped in [step 1](#).

Scheduled Backups in a Microsoft Cluster

To schedule a backup of Exchange data within a Microsoft cluster, use the NetWorker Administrator program to configure NetWorker server resources. For detailed instructions on configuring NetWorker server resources, refer to the appropriate *NetWorker Administrator's Guide*.

How to Schedule a Backup in a Microsoft Cluster

The following instructions use an example cluster configuration in which *node_a* and *node_b* represent the physical nodes, and *virtual_server_name* represents the network name of the virtual Exchange server.

To configure a scheduled backup of one or more virtual Exchange servers:

1. Create a Group resource for Exchange backups. For more information, see ["Task 2: Configure One or More Group Resources"](#) on page 53.
2. Create a Client resource for each physical node and virtual server in the cluster. For example, create Client resources for *node_a*, *node_b*, and *virtual_server_name*. For more information, see ["Task 3: Configure One or More Client Resources"](#) on page 55.

Note: If the cluster has more than one virtual server, create a Client resource for each. You may have up to four virtual servers in a cluster.

3. Ensure that the NetWorker server receives an *authoritative* DNS reply for at least one name in the Alias attribute for each Client resource. To verify an authoritative DNS reply, enter the following at the command prompt:

```
%SystemRoot%\nslookup alias_name
```

where *alias_name* is a name listed in the Alias attribute of the Client resource.

Note: If the resulting message does not show "nonauthoritative," then the reply is "authoritative."

4. Edit the Client resource for each virtual server in the cluster. Specify attribute values as follows:

- a. In the Save Set attribute, specify the save set for each Exchange object you want to back up. For information about specifying save sets, see ["Using Save Set Notation" on page 149](#).

- b. In the Backup Command attribute, enter the **nsrxchsv** command with the necessary options. The *virtual_server_name* is the network name of the Exchange server. This is the name an e-mail client (for example, Microsoft Outlook) uses to connect to the Exchange server.

The **-c** *virtual_server_name* command option is required. For example, to schedule snapshot backups of a virtual server named *EXSRV1*, enter the following in the Backup Command attribute:

```
nsrxchsv -c EXSRV1
```

Note: For backward compatibility, the **-a** *virtual_server_name* option of the **nsrxchsv** command can be used for traditional backups.

- c. In the Remote Access attribute, enter the following:

```
system@node_a  
system@node_b
```

5. Edit the Group resource for the Exchange backup group. Set the backup level as shown in [Table 7, "Media Database Entries for Backup Levels," on page 67](#).
6. Start the group manually, or wait for the next scheduled backup to occur.
7. After the backup is finished, use the NetWorker Administrator program to verify that the backup was indexed by using the Exchange server's network name (*virtual_server_name*). For instructions, refer to the appropriate *NetWorker Administrator's Guide*.

Manual Backups in a Microsoft Cluster

Starting a manual backup in a Microsoft cluster is similar to starting a manual backup on a stand-alone Exchange server. The only difference is that when you start a manual backup in a Microsoft cluster with multiple virtual servers, you need to select the virtual server to make active.

How to Start a Manual Backup in a Microsoft Cluster

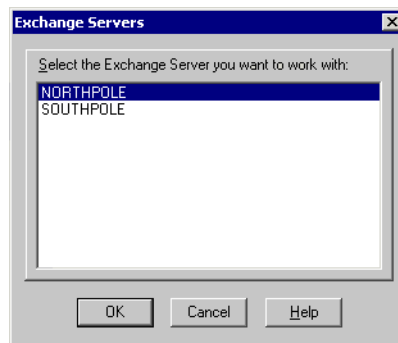
To start a manual backup in a Microsoft cluster:

1. Start the NetWorker User for Exchange Server program.

Note: When you start the program from within a Microsoft cluster with multiple virtual servers, the Exchange Servers dialog box appears before the main window opens.

2. In the Exchange Servers dialog box, select a virtual server from the list of online virtual servers in the cluster, as shown in [Figure 26 on page 127](#).
3. Configure and run the backup just as you would on a stand-alone server. For instructions, see "[Performing a Manual Backup](#)" on page 38.

Figure 26. Exchange Servers Dialog Box



How to Switch to a Different Virtual Server

To switch to a different virtual server:

1. Start the NetWorker User for Exchange Server program, but do not open the Backup or Recover window.
2. From the Operation menu, select Select Exchange Cluster Virtual Server (or click the Select Exchange Cluster Virtual Server button on the toolbar).
3. In the Exchange Servers dialog box, select the name of the virtual server to make active, as shown in [Figure 26 on page 127](#), and click OK.

How to Start a Manual Backup from the Command Prompt

To start a manual backup of an Exchange virtual server from the command prompt:

1. Start the command prompt, either on *node_a* or *node_b*.
2. Enter the `nsrxchsv` command, using appropriate options. For example:

```
nsrxchsv -s NetWorker_server -c virtual_server_name -l Backup_level  
MSEXCH: IS
```

where *virtual_server_name* is the network name of the Exchange server.

For more information about `nsrxchsv` command syntax, see "[NetWorker Module Backup Commands](#)" on page 153.

For more information about specifying save sets, see "[Save Set Notation](#)" on page 150. If you do not specify a valid save set, the program terminates with an error message.

3. After the backup is finished, use the NetWorker Administrator program to verify that the backup was indexed by using the Exchange server's network name (*virtual_server_name*). For instructions, refer to the appropriate *NetWorker Administrator's Guide*.

6

Using a NetWorker Module Input or Exclude File in a Microsoft Cluster

To use the `-I input_file` or `-X exclude_file` options to list the Exchange objects to back up or exclude on a virtual server, create a uniquely named input or exclude file for each of the cluster's virtual servers. The path specified for the input and exclude files must work on any physical node in the cluster, and the content of the files must be kept in sync. For an example of how to do this, see "[Creating an Input or Exclude File for Traditional Backup of Two Virtual Servers](#)" on page 129

For detailed instructions on creating an input file, see "[Task 1: Create the Input or Exclude File](#)" on page 111.

To use an input and/or exclude file for scheduled backups, specify the input and/or exclude file in the Backup Command attribute of the Client resource. You can also use input and exclude files when running a manual backup from the command prompt.



Example: Creating an Input or Exclude File for Traditional Backup of Two Virtual Servers

1. Create an input or exclude file named *vserver1.txt*, and another input or exclude file named *vserver2.txt*. Place copies of both files in the following directory on *node_a* and *node_b*:

```
<NetWorker_install_path>\bin
```

2. In the Backup Command attribute of the Client resource for *node_a*, enter the following:

For an input file,

```
nsrxchsv -I vserver1.txt -c vserver1
```

For an exclude file,

```
nsrxchsv -X vserver1.txt -c vserver1 MSEXCH:MB/
```

3. In the Backup Command attribute of the Client resource for *node_b*, enter the following:

If you created an input file,

```
nsrxchsv -I vserver2.txt -c vserver2
```

If you created an exclude file,

```
nsrxchsv -X vserver2.txt -c vserver2 MSEXCH:MB/
```

Recovering an Exchange Server Database in a Cluster

This section provides procedures for recovering Exchange data on a virtual server in a Microsoft cluster.

How to Start a Recovery Using NetWorker User for Exchange Server

Starting a recovery in a Microsoft cluster is similar to starting a recovery on a stand-alone Exchange server. The only difference is selecting the virtual server to make active.

To start a recovery in a Microsoft cluster:

1. Start the NetWorker User for Exchange Server program.

Note: When you start the program from within a Microsoft cluster with multiple virtual servers, the Exchange Servers dialog box appears before the main window opens.

2. In the Exchange Servers dialog box, select a virtual server from the list of online virtual servers in the cluster.
3. Configure and run the recovery just as you would on a stand-alone server. For instructions, see ["Performing a Recovery" on page 83](#).

How to Start a Recovery From the Command Prompt

To start a recovery of an Exchange virtual server from the command prompt:

1. Set the database properties to allow the restored data to overwrite the database. For instructions, see ["Task 2: Set Exchange Database Properties to Allow Restore" on page 84](#).
2. Start the command prompt, on either *node_a* or *node_b*.
3. Enter the `nsrxchrc` command, using appropriate options. For example:

```
nsrxchrc -erq -c client_name -s NetWorker_server_name
-a virtual_server_name MSEXCH:IS
```

Note: The `-a` option is required for all virtual server recoveries.

For more information about `nsrxchrc` command syntax, see ["NetWorker Module Recover Commands" on page 156](#).

For more information about specifying save sets, see ["Save Set Notation" on page 150](#). If you do not specify a valid save set, the program terminates with an error message.



Important: After the files are recovered, the Exchange Server may require a long time to replay the transaction logs, depending on the system configuration, Exchange Server parameters, and the number of logs recovered. You can monitor transaction log progress with the Windows Event Viewer. The advisory message indicates the following:

The database engine is replaying log file `exxxxxxx.log`
where `xx` is the storage group number starting with `00`, and `xxxxxx` is a five-digit hex number.

Backup and Recovery Recommendations

Keep the following in mind when performing backup and recovery operations:

- To improve post-recovery processing of Exchange databases, minimize the number of transaction logs that are backed up. You can do this by increasing the frequency of full backups. For example, schedule a full backup whenever incremental or differential backups contain more than 50 log files.
- Test recovery procedures on a regular basis.

Chapter 7: Disaster Recovery

This chapter provides procedures for recovering Microsoft Exchange Server data in the event of a disaster. It includes the following sections:

- ["Disaster Recovery Scenarios" on page 133](#)
- ["Recovery Requirements" on page 134](#)
- ["Performing the Recovery" on page 135](#)

Disaster Recovery Scenarios

For the purpose of this guide, a *disaster* is any situation in which normal day-to-day access to data on the Exchange server is disrupted due to damage to critical hardware, software, or data. A disaster may entail losing data files, the operating system, or the entire computer. The extent of the loss determines the method for recovering to the predisaster state.

Plan for the possibility that a disaster recovery may become necessary at some point. Proper disaster recovery planning begins long before a failure occurs.

An Exchange server disaster recovery plan should cover all aspects of your network environment that are relevant to Exchange servers. The plan should ensure that you have an adequate number of domain controllers for each domain and geographical location. In addition to developing a protection scheme for Exchange data, you may also need to plan for recovery of Exchange server components such as clustering and RAID configurations. Knowing the minimum information necessary to back up in order to perform a successful recovery will help determine the best plan for your situation.

This chapter addresses two scenarios for disaster recovery:

- Rebuilding the Exchange server on the original host computer. In this case, you partially install and configure the operating system with only those components necessary to enable the computer to communicate over the network. After partially installing and configuring the operating system, you perform a NetWorker file system recovery to recover the remaining operating system components and configuration files.
- Building a new Exchange server host on a new computer. This is necessary if the original Exchange server host is being replaced. In this case, it is best to perform a complete installation and configuration of the operating system.

Note: The disaster recovery procedure in this chapter pertains to both of the scenarios described above, except where noted. Depending on the extent of the disaster, you may or may not need to perform all parts of this procedure. If any task or step of the procedure does not apply to your situation, skip it and proceed to the next task or step.

Recovery Requirements

To recover the Windows operating system to its predisaster state, you need (at a minimum) the following information about the state of the computer immediately prior to the disaster:

- Operating system version and all previously applied patches, hot fixes, service packs, and option packs
- Hardware components and configuration
- TCP/IP properties
- Any other protocols installed (in addition to TCP/IP)
- IP address
- Default gateway

- Subnet mask
- DNS server
- Host properties:
 - Hostname
 - Domain name
 - Administrator account name and password
 - Date and time properties
 - Virtual memory settings

Note: For more information about recovery requirements, refer to the *NetWorker Disaster Recovery Guide*.

Performing the Recovery

Use the following roadmap to recover an Exchange server after a disaster:

- ["Task 1: Install the Operating System on the Exchange Server Host" on page 135](#)
- ["Task 2: Configure the Exchange Server for the Recovery" on page 137](#)
- ["Task 3: Recover the File System to the Exchange Server Host" on page 138](#). Perform this task only if you are rebuilding the same Exchange server host (the same physical computer) used previously.
- ["Task 4: Recover the Exchange Data" on page 138](#)

Task 1: Install the Operating System on the Exchange Server Host

To install the operating system:

1. If you are rebuilding an Exchange server on a new computer, format the new drive. For instructions, refer to the manufacturer's documentation.
2. Install the same Windows version, patches, hot fixes, service packs, and options that were in use immediately prior to the disaster. Use the information gathered during the disaster planning phase to match the predisaster software configuration exactly. For more information, see ["Recovery Requirements" on page 134](#). Install to the same drive letter (for example, C:), and path used previously. For instructions, refer to the operating system documentation.
3. While installing the operating system on the Exchange server host, start the Active Directory Users and Computers program on a domain controller.

4. Right-click the Exchange server hostname and select Reset Account. (*Do not delete the account.*)

Note: Resetting the computer account allows the rebuilt computer to join the domain by using the same hostname as the old computer. If this command is carried out when the computer is not reinstalled, the computer cannot authenticate in the domain.

5. During the operating system installation, make the computer a member of a workgroup (*not a domain*). If the computer being recovered was previously a domain controller or a member of a domain, it will be restored to the correct configuration during the recovery.
6. Configure the computer properties to match the original configuration. This includes the local administrator account name and password, the hostname, and the fully qualified domain name.

For example, the fully qualified domain name for a computer named *rainier* in a domain named *legato.com* would be:

rainier.legato.com

Note: If you do not use the original hostname, you cannot recover the data that the NetWorker software saved using the original hostname.

To ensure the correct domain name is specified:

- a. Right-click the My Computer icon and select Properties.
 - b. In the System Properties dialog box, select the Network Identification tab.
 - c. In the Network Identification dialog box, click the Properties button.
 - d. In the Identification Changes dialog box, click the More button.
 - e. In the DNS Suffix and NetBIOS Computer Name dialog box, ensure that the Primary DNS Suffix Of This Computer text box contains the domain name. If it does not, enter the domain name in this text box.
7. Configure the TCP/IP properties to match the original configuration, with the same fully qualified domain name, IP address, default gateway, subnet mask, and DNS server. To view the TCP/IP properties, enter the following at the command prompt:

```
ipconfig /all
```

Note: If the IP address for the new computer does not match the original address, the NetWorker software assigns a new host ID to the computer and you must reregister the NetWorker software. For more information, refer to the *NetWorker Installation Guide*.

8. Ensure that the *hosts* file (*%SystemRoot%\system32\drivers\etc\hosts*) includes an entry for the NetWorker server to be used in the recovery. The NetWorker software requires this in either of the following cases:
 - DNS is not in use, or no DNS server is available.
 - The NetWorker server used for the recovery is a DNS server.
 The entry in the *hosts* file must be on one line, in the following format:


```
IP_address fully_qualified_domain_name hostname
```

 For example:


```
123.56.890.474 charon.pluto.legato.com charon
```
9. Configure the Date/Time Properties as they were before the disaster.

Task 2: Configure the Exchange Server for the Recovery

To configure the Exchange server host computer for the recovery:

1. Using the Windows Control Panel System tool, configure the virtual memory settings to match the settings on the original server.

Note: Virtual memory settings are on the Advanced tab, in the Performance section.
2. If the computer is to be a domain controller, edit the *hosts* file (*%SystemRoot%\system32\drivers\etc\hosts*) and add an entry for the NetWorker server host. Include the following:
 - IP address
 - Fully qualified domain name
 - Any aliases that will be used for the recovery
3. On the Exchange server host, run the following at the command prompt to verify network connectivity to the NetWorker server:


```
ping NetWorker_server_hostname
```
4. Install the NetWorker client software in the same location it was installed on the original Exchange server host. For instructions, refer to the *NetWorker Installation Guide*.

Task 3: Recover the File System to the Exchange Server Host



Important: Perform this task only if you are rebuilding the same Exchange server host (the same physical computer) used previously.

To recover the file system to the Exchange server host:

1. Start the NetWorker User client program.
2. Click Recover.
3. In the Recover window, select the following items for recovery:
 - All local physical disk drives
 - SYSTEM STATE
 - SYTEM FILES
 - SYSTEM DB
4. From the Options menu in the Recover window, select Recover Options.
5. In the Recover Options window, select Overwrite Existing File.
6. Click Start.
7. Reboot the computer when the recovery operation is finished.

Task 4: Recover the Exchange Data

The file system recovery performed in Task 3 restored some of the Exchange server application files. To complete the recovery:

1. Log on to the Exchange server host with Windows domain administrator privileges and Exchange Full Administrator privileges (not just Exchange Administrator privileges). If you are logged on without the proper privileges, you cannot run the Microsoft Exchange Server Setup program in disaster recovery mode.
2. Load the Microsoft Exchange Server CD-ROM, or use Windows Explorer to navigate to a network location where the Microsoft Exchange Server installation files are stored.

3. At the command prompt, enter the following command to run the Microsoft Exchange Server Setup program in disaster recovery mode:

setup /DisasterRecovery

Note: Do not enter a space character in */DisasterRecovery*.

4. If any Microsoft Exchange Server service packs or hot fixes were installed prior to the disaster, run the following at the command prompt to install the necessary updates:

update /DisasterRecovery

5. If you are rebuilding an Exchange server on the same computer, from each storage group directory, delete all *e*.log* files (except *e01.log*, *e02.log*, *e03.log*, and *e04.log*).
6. If you are building an Exchange server on a new computer:
 - a. Using the Exchange Server System Manager program, re-create the storage groups and databases that existed at the time of the backup to be recovered.
 - b. For each database to be recovered, right-click the database name and select Properties. In the Database Properties dialog box, select "Allow database to be overwritten by a restore."
 - c. Install the NetWorker Module for Exchange Server software.
7. Start the NetWorker User for Exchange Server program and open the Recover window.
8. In the Recover window, specify the browse time and recover options. For instructions, see ["Chapter 4: Recovering Data from a Backup" on page 77](#).
9. Mark the Exchange objects to recover.

10. Select Recover Options from the Options menu and check the settings on the Recovery Options dialog box to verify that the options are set correctly for this recovery.



Important: If performing disaster recovery by using a snapshot backup, you must select the "Replay only logs from this restore" option on the Exchange tab. This restores the data to its state at the time of the backup. Log files created after the backup are not replayed. If this option is not selected, the recovery will fail.

11. Click Start.
12. When the recovery is finished, reboot the computer.

If you encounter any security errors after this procedure (for example, an "access denied" message or the System Attendant fails to start), run the Exchange 2000 reinstall program to repair incorrect settings on the server.

Chapter 8: Troubleshooting

This chapter provides information for troubleshooting problems with the NetWorker Module for Exchange Server. It contains the following sections:

- ["Backup or Recovery Does Not Start" on page 141](#)
- ["NetWorker Module Log Files" on page 142](#)
- ["Specifying the Diagnostic Output Level" on page 142](#)
- ["Problems with Scheduled Mailbox Backups" on page 143](#)
- ["Displaying Client File Index Contents" on page 144](#)
- ["Using the Windows Event Log" on page 145](#)
- ["Using Windows Support Tools" on page 145](#)
- ["Active Directory Connection Problems" on page 145](#)
- ["Monitoring Backups and Recoveries" on page 146](#)

Backup or Recovery Does Not Start

The amount of time the NetWorker Module takes to start a backup or recovery depends on several factors, including the amount of data to be transferred, network traffic, server load, and positioning of the storage medium (tape, for example) in the drive.

A backup or recovery may not start promptly if:

- **Another operation is already in progress.** Before starting a backup or recovery, ensure another backup or recovery is not in progress.
- **No media volume is mounted.** A backup cannot run if no writable volume is mounted on a NetWorker server or storage node device. It is best to have a labeled volume mounted at all times. Label for the pool

where the backup is to be sent. If no volume is in the device when a scheduled backup is triggered, no messages appear in the status window, and the backup waits for operator intervention.

NetWorker Module Log Files

The activity of each backup and recovery, including error messages, is logged in the following files, which are located in `<NetWorker_install_path>\applogs` on the Exchange server host:

- *nsrxchsv.log* — contains backup messages.
- *lnmck_msexch.log* — contains database consistency check messages for snapshot (not traditional) backups.
- *nsrxchrc.log* — contains recovery messages.

The NetWorker Module's backup, recovery, and database consistency checking processes append the activity of each operation to the existing log file, or create a new log file if none exists. You can delete the logs files when the information is no longer needed.

Note: If a problem occurs, you will be asked to provide the log files to NetWorker Technical Support for troubleshooting purposes.

Specifying the Diagnostic Output Level

The diagnostic output level specified for a backup or recovery operation determines the amount of detail that appears in the Backup Status or Recover Status window of the NetWorker User for Exchange Server program. The diagnostic output is also saved in the *nsrxchsv.log* and *nsrxchrc.log* files.



Important: Set the diagnostic output level above zero *only* when troubleshooting or closely monitoring a backup or recovery. The diagnostic output is intended for use by Technical Support. The messages are not documented. Setting this level above zero can create large log files that can use significant amounts of disk space. Remember to remove debug log files when they are no longer needed.

For instructions on setting the diagnostic output level in the NetWorker User for Exchange Server program, see:

- ["Task 3: Set the Backup Options" on page 41](#)
- ["Task 7: Set the Recovery Options" on page 93.](#)

For information about specifying diagnostic output level when running a backup or recovery operation from the command prompt, see:

- ["NetWorker Module Backup Commands" on page 153](#)
- ["NetWorker Module Recover Commands" on page 156](#)

Problems with Scheduled Mailbox Backups

Scheduled backups are initiated by the NetWorker Remote Exec service (**nsrexecd.exe**) on the NetWorker client. The NetWorker client software installation configures this service to run under the local System account. This causes problems with scheduled mailbox backups because the local System account does not have the required privileges. For example, the scheduled backup may fail with the following error:

```
OpenMsgStore() = 0x8004011d: The Microsoft Exchange Server computer is not available. Either there are network problems or the Microsoft Exchange Server computer is down for maintenance. (Microsoft Exchange Server Information Store)
```

To identify the account being used for the scheduled backup, check the *nsrxcsv.log* file for the user name that invoked the backup. The following example shows a backup that was run by the local System account:

```
Computer Name: ZEBRA User Name: SYSTEM
```

To correct this problem, edit the NetWorker Client resource for each Exchange server, and specify an account with sufficient privileges to back up Exchange mailboxes. For the Remote User attribute, enter the correct user name and password. (This is typically the name of the account used to install the Microsoft Exchange Server software.) For instructions on editing NetWorker resources, refer to the *NetWorker Administrator's Guide*.

Ensure the following requirements are met:

- The user must be logged on to the Exchange server host as a member of the Exchange Administrators group.
- The following permissions must be set for the user in the Exchange System Manager program:
 - List contents
 - Read properties
 - Administer Information Store
 - View Information Store status
 - Receive as
 - Send as

Displaying Client File Index Contents

The **nsrinfo** NetWorker client program displays the contents of the client file index. This can be useful for determining whether a particular Exchange object has ever been backed up, or to determine what files were backed up during a given backup sequence.

To display the Exchange objects in the client file index, enter the following at the command prompt:

```
nsrinfo -s server -n msexch client
```

where:

- *server* is the hostname of the NetWorker server.
- *client* is the hostname of the Exchange server (which is configured as a NetWorker client).

For more information about using the **nsrinfo** command, refer to the *NetWorker Command Reference Guide*.

Using the Windows Event Log

The Windows application event log can be a useful source of information regarding backup or recovery activity. Both the Exchange server and this NetWorker Module write information to the event log. This makes it possible to follow the sequence of events that occur during a backup or recovery.

It is also possible to save the contents of the event log to a file (either *.evt* or *.txt*). The event log file can be provided to Technical Support to help troubleshoot problems.

Using Windows Support Tools

The Microsoft Windows installation CD provides support tools that can be helpful for diagnosing problems. The following tools are particularly useful:

- **nltest** — Verifies that the locator is functioning. The following command lists information about the specified domain:
nltest /dsgetdc:domain
- **netdiag** — Performs network diagnostic tests to identify configuration or connection problems.

For a complete list of the tools available, and instructions for installing and using them, refer to the Microsoft documentation.

Active Directory Connection Problems

The following are common problems associated with Windows Active Directory connection:

- Active Directory connection problems are often caused by DNS configuration errors. Both the primary and secondary DNS server must have a valid entry for the host. To verify this, run the following commands at the command prompt:
nslookup hostname primary_dns_server
nslookup hostname secondary_dns_server
where *hostname* is the name of the Exchange server host computer.
- The Windows Power Management feature can be configured to turn off the network interface card. Make sure this option is *not* enabled.

- In a Microsoft cluster, the private network must be configured correctly to ensure proper operation. For recommendations on configuring the cluster private network, refer to Microsoft Knowledge Base article 258750, *Recommended Private 'Heartbeat' Configuration on a Cluster Server*.
- Cluster failover problems can occur if DNS is not configured correctly. The primary and secondary DNS servers must both have valid host entries for each physical node and each virtual server. Failover will not work if the virtual server host entries are not valid.

Monitoring Backups and Recoveries

This section explains how to use the Windows Performance Monitor to monitor NetWorker Module backup and recovery operations.

Note: This NetWorker Module does not provide Windows Performance Monitor support for snapshot backup and recovery operations.

The Performance Monitor measures the performance of one or more computers on a network. It allows you to view the behavior of objects such as processors, memory, cache, threads, and processes. The Performance Monitor provides charting and reporting capabilities that reflect both current activity and ongoing logging. You can use the Performance Monitor to view detailed information about the progress of NetWorker Module backup and recovery operations. Because this NetWorker Module supports multiple Performance Monitor instances, it is possible to monitor parallel operations.

Using the Performance Monitor

The Performance Monitor displays the NetWorker Module software in the Performance submenu option during a backup or recovery operation.

To use the Performance Monitor:

1. Start the Performance Monitor by selecting Start>Programs>Administrative Tools >Performance.
2. On the toolbar in the right pane of the Performance Monitor window, click the plus icon.
3. In the Add Counters dialog box, make sure the correct server is selected in the Select Counters From Computer list box.

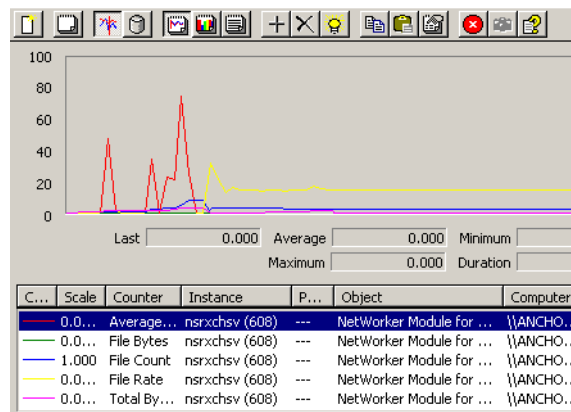
4. Using the NetWorker User for Exchange Server program, start a backup or recovery. For instructions, see ["Performing a Backup with NetWorker User for Exchange Server"](#) on page 38 or ["Performing a Recovery"](#) on page 83.
5. In the Performance Monitor Add Counters dialog box, select NetWorker Module for Exchange Server from the Performance Object list.
6. In the Select Counters From List box, select any of the counters that are supported for this NetWorker Module and click Add.

Supported counters include:

- **Average Rate** — Average throughput rate for all files in the current operation.
- **File Bytes** — Number of bytes processed by the current operation.
- **File Count** — Number of Exchange files or mailboxes processed by the current operation.
- **File Rate** — Throughput rate for the current file.
- **Total Bytes** — Total number of bytes processed during the current operation.

The Performance Monitor window ([Figure 27 on page 147](#)) reflects system activity as the backup or recovery operation progresses.

Figure 27. Performance Monitor Window



Appendix A: Save Set Notation and Command Syntax

This appendix provides save set notation, command syntax, and related information for the NetWorker Module for Exchange Server. It includes the following sections:

- ["Using Save Set Notation" on page 149](#)
- ["NetWorker Module Backup Commands" on page 153](#)
- ["NetWorker Module Recover Commands" on page 156](#)

Using Save Set Notation

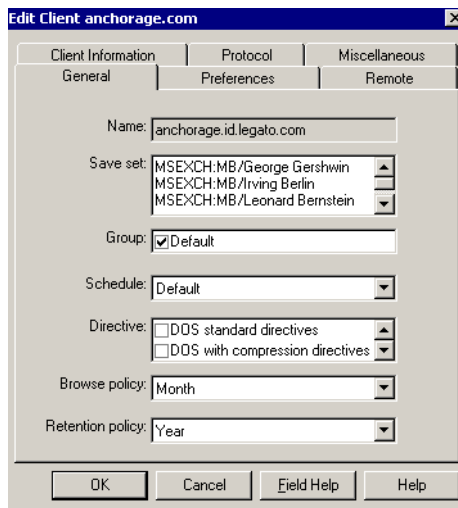
Use save set notation to specify Exchange objects to include in the following kinds of operations:

- Traditional backups or recoveries from the command prompt. For example, to back up a private mailbox named *Ben Franklin*, and a database named *Engineering* in a group named *Engineering Group*, enter the following at the command prompt:

```
nsrxchsv "MSEXCH:MB/Ben Franklin" "MSEXCH:IS/Engineering Group/Engineering"
```
- Traditional or snapshot scheduled backups. For scheduled backups, save sets are specified in the Save Set attribute of the Exchange server's Client resource on the NetWorker server, as shown in [Figure 28 on page 150](#).

Note: Including snapshot and traditional save sets in the same operation is not supported. For example, you cannot include a snapshot save set for a storage group (MSEXCH:SS/*Storage_Group*) in the same operation with traditional save sets, such as MSEXCH:IS, MSEXCH:SRS, MSEXCH:KMS, MSEXCH:MB, or MSEXCH:PF.

Figure 28. Private Mailbox Save Sets in Edit Client Dialog Box in NetWorker Administrator Program



Save Set Notation

[Table 15 on page 151](#) specifies the notation for save sets that the NetWorker Module for Exchange Server can back up or recover.



Important: Use only the save set specifications in [Table 15 on page 151](#) for backing up Exchange objects. The NetWorker save set All is used only for NetWorker file system and system state backups. Save set All is *not* a valid NetWorker Module save set, and cannot be used for backing up Exchange objects. This is because the NetWorker server software does not interact directly with the [Exchange Backup API](#) for backup and restore operations; that is the purpose of this NetWorker Module.

Object names containing blank spaces *must* be enclosed in quotation marks (" ") when entered at the command prompt. Quotation marks are *not* required when entering save set names in the NetWorker Administrator program, or in an input or exclude file.

Table 15. Save Set Notation (Part 1 of 2)

Save Set	Description
MSEXCH:	All Extensible Storage Engine (ESE) enabled applications on the server. This includes IS, SRS, and KMS; it does <i>not</i> include private mailboxes and public folders. Note: Prior to NetWorker Module release 3.0, a full backup was always performed when MSEXCH: was specified. In release 3.0 and later, the backup level specified in the backup group schedule is used.
MSEXCH:SS	A snapshot that includes all storage groups
MSEXCH:SS / <i>storage_group</i>	A snapshot that includes all databases and transaction logs in the specified storage group
MSEXCH:IS	All storage groups
MSEXCH:IS / <i>storage_group</i>	All databases in a storage group
MSEXCH:IS / <i>storage_group/database</i>	A specific database in a storage group
MSEXCH:KMS	All KMS storage groups
MSEXCH:KMS / <i>storage_group</i>	A specific KMS storage group
MSEXCH:KMS / <i>storage_group/database</i>	A specific KMS database in a storage group
MSEXCH:SRS	All SRS storage groups
MSEXCH:SRS / <i>storage_group</i>	A specific SRS storage group
MSEXCH:SRS / <i>storage_group/database</i>	A specific SRS database in a storage group
MSEXCH:MB	All private mailboxes
MSEXCH:MB / <i>mailbox</i>	A specific private mailbox
MSEXCH:MB / <i>mailbox/folder/</i>	A specific folder in a private mailbox
MSEXCH:MB / <i>mailbox/folder/subject_line</i>	An individual item in a specific folder in a private mailbox

Table 15. Save Set Notation (Part 2 of 2)

Save Set	Description
MSEXCH:PF	All public folders
MSEXCH:PF /folder_tree/folder/	A specific public folder
MSEXCH:PF /folder_tree/folder/subject_line	An individual item in a specific public folder Note: This syntax is supported for backup and recovery operations from the command prompt on Microsoft Exchange Server 2000 only. For Microsoft Exchange Server 2003, individual items in public folders can only be backed up and recovered by using the NetWorker User for Exchange Server program.
MSEXCH:DS	This save set is <i>obsolete</i> . Note: Prior to NetWorker Module release 3.0, this save set was used to specify the Exchange server directory store. All currently supported versions of Microsoft Exchange Server store directory information in the Active Directory.

Notes:

- Anything under the Information Store hierarchy (MSEXCH:IS/...) is backed up and recovered at the database level. This also pertains to the Site Replication Server (MSEXCH:SRS) and the Key Management Server (MSEXCH:KMS) because they also use the Exchange Backup API. Objects under the private mailboxes (MSEXCH:MB/...) and public folder (MSEXCH:PF/...) hierarchies are backed up and recovered at the brick level. You can only perform a mailbox recovery if you performed a mailbox (*brick-level*) backup.
- This NetWorker Module does *not* support snapshot backups at the database level. If an individual database is specified, a snapshot backup is automatically performed on the entire storage group. For example, if you enter **MSEXCH:SS/ Storage Group 1/Database 2** in the Save Set attribute of the Exchange server's Client resource, *all* databases in Storage Group 1 are backed up.

Specifying Multiple Save Sets by Using an Input or Exclude File

To specify multiple save sets, such as several individual user mailboxes, you can use the **-I** or **-X** options. See ["Task 1: Create the Input or Exclude File" on page 111](#).

NetWorker Module Backup Commands

To configure scheduled backups of Exchange data, specify the NetWorker Module for Exchange Server backup command (**nsrxchsv**) with appropriate options in the Backup Command attribute of the Exchange server's Client resource on the NetWorker server. For more information, see ["Task 3: Configure One or More Client Resources" on page 55](#).

To perform manual backups from the command prompt on the Exchange server, run the **nsrxchsv** command with appropriate options.



Important: This NetWorker Module does not support snapshot backups from the command prompt. All snapshot backups must be configured as scheduled backups on the NetWorker server. For instructions, see ["Chapter 3: Scheduled Backups" on page 47](#).

Backup Command Syntax

[Table 16 on page 153](#) defines the **nsrxchsv** command syntax.

Table 16. Backup Command Syntax

Function	Command Syntax
Backup	nsrxchsv [-a <i>virtual_server</i>] [-b <i>pool</i>] [-c <i>client_name</i>] [-D <i>diagnostic_level</i>] [-e <i>date</i>] ¹ [-G] [-g <i>group</i>] [-I <i>input_file</i>] [-Kd] [Ks] [-l <i>backup_level</i>] [-m <i>masquerade</i>] [-N <i>name</i>] [-p <i>temp_dir</i>] [-q] [-s <i>NetWorker_server_name</i>] [-v] [-w <i>browse_date</i>] [-Ks] [-x] [-X <i>exclude_file</i>] [-y <i>retention_date</i>] <i>save_set1</i> [<i>save_set2</i> <i>save_set3</i> ...] ¹
¹ For information about notation for specifying save sets, see Table 15 on page 151 .	

Table 17 on page 154 defines the `nsrxchsv` command options.

Table 17. Backup Command Options (Part 1 of 3)

Command Option	Function
-a <i>virtual_server_name</i>	Specifies the MSCS virtual server name. The value for <i>virtual_server_name</i> must be the hostname of the virtual server. It cannot be the fully qualified domain name.
-b <i>pool</i>	Specifies the NetWorker volume pool name.
-c <i>client_name</i>	Specifies the NetWorker client name (hostname of the client host whose data is to be backed up). The value for <i>client_name</i> should be the fully qualified domain name of the NetWorker client.
-D <i>diagnostic_level</i>	<p>Specifies the level of diagnostic output, which can be used for troubleshooting. Valid values range from 0 through 9. The default is 0 (when -D is not specified, there is no diagnostic output).</p> <p>Note: Set this level above zero (0) <i>only</i> when troubleshooting or closely monitoring a backup. Diagnostic output is intended for use by NetWorker Technical Support. The messages are not documented. Setting this level above zero can create large log files that use significant amounts of disk space. Remember to remove debug log files when they are no longer needed.</p>
-e <i>date</i>	Specifies the retention date. For details about using this option and any restrictions that apply, refer to the <i>NetWorker Administrator's Guide</i> .
	Specifies the expiration date. For usage details and restrictions about using this option, refer to the <i>NetWorker Administrator's Guide</i> .

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Table 17. Backup Command Options (Part 2 of 3)

Command Option	Function
-G	Indicates an Item Level mailbox granularity setting for the mailbox (<i>brick-level</i>) backup. The Item Level setting allows for the recovery of individual mailbox items. This option provides finer granularity, but results in larger client file indexes on the NetWorker server. If -G is not specified, the default Folder Level setting is used. This setting allows for the recovery of mailbox items at the folder level only. The result is smaller client file indexes, which greatly enhances the performance of the NetWorker server at recovery time.
-g <i>group</i>	Specifies the group name.
-I <i>input_file</i>	Specifies the text file that lists Exchange objects and/or save sets to back up. If an input file is used, Exchange object save sets specified individually on the command line are ignored. For instructions on using input text files, see "Using Input and Exclude Files to Specify Objects for Backup" on page 110.
-Kd	Excludes the Deleted Items folder of all mailboxes during the backup operation.
-Ks	Excludes the Sent Items folder of all mailboxes during the backup operation.
-l [full incr diff copy]	Specifies the backup level. Use the -l option with the level parameter, such as incr , in the command. For example: nsrxchsv -s NW_server_name -l incr
-m <i>masquerade</i>	Specifies the masquerade. For more information, refer to the <i>NetWorker Command Reference Guide</i> .
-N	Specifies the save set name.
-p <i>temp_dir</i>	Specifies the path to the directory that stores temporary files.
-q	Saves in quiet mode.
-s <i>NW_server_name</i>	Specifies the NetWorker server that is to back up the Exchange data.

Table 17. Backup Command Options (Part 3 of 3)

Command Option	Function
<code>-w browse_date</code>	Specifies the browse date (not available with NetWorker server release 5.7). With NetWorker server release 6.1, this option may be used with the <code>-y</code> option, but not with the <code>-e</code> option.
<code>-X exclude_file</code>	Specifies the text file that lists Exchange mailbox objects and/or save sets <i>not</i> to back up. If an exclude file is used, mailbox object save sets specified individually on the command line are ignored. For instructions on using exclude text files, see "Using Input and Exclude Files to Specify Objects for Backup" on page 110 .
<code>-x</code>	Prevents the completion of the Exchange recovery operation (replay logs).
<code>-y retention_date</code>	Specifies the retention date (NetWorker server release 6.1 only). With NetWorker server release 6.1, this option may be used with the <code>-w</code> option, but not with the <code>-e</code> option.

NetWorker Module Recover Commands

To perform a recovery from the command prompt on the Exchange server, run the NetWorker Module for Exchange Server recover command (`nsrxchrc`) with appropriate options.



Important: This NetWorker Module does not support snapshot recovery from the command prompt. You must use the NetWorker User for Exchange Server program for snapshot recoveries. For instructions, see ["Chapter 4: Recovering Data from a Backup" on page 77](#).

Table 18 on page 157 defines the `nsrxchrc` command syntax.

Table 18. Recover Command Syntax

Function	Command Syntax
Recover	<code>nsrxchrc [-erqv][-a <i>virtual_server_name</i>] [-c <i>client_name</i>] [-D <i>diagnostic_level</i>] [-I <i>input_file</i>] [-p <i>temp_dir</i>] [-s <i>NetWorker_server_name</i>] [-t <i>browse_time</i>] <i>save_set1</i> [<i>save_set2</i> <i>save_set3</i> ...]¹</code>
¹ For information about notation for specifying save sets, see Table 15 on page 151.	

Table 19 on page 157 defines the `nsrxchrc` command options.

Table 19. Recover Command Options (Part 1 of 2)

Option	Function
-a <i>virtual_server_name</i>	Specifies the MSCS virtual server name. The value for <i>virtual_server_name</i> must be the hostname of the virtual server; it cannot be the fully qualified domain name.
-c <i>client_name</i>	Specifies the NetWorker client name for directed recovery. The value for <i>client_name</i> should be the fully qualified domain name of the NetWorker client.
-D <i>diagnostic_level</i>	Specifies the level of diagnostic output, which can be used for troubleshooting. Valid values range from 0 through 9. The default is 0 (when -D is not specified, there is no diagnostic output). Note: Set this level above zero (0) <i>only</i> when troubleshooting or closely monitoring a recovery. Diagnostic output is intended for use by NetWorker Technical Support. The messages are not documented. Setting this level above zero can create large log files that use significant amounts of disk space. Remember to remove debug log files when they are no longer needed.
-e	Replays only recovered logs.
-I <i>input_file</i>	Specifies the text file that lists Exchange objects and/or save sets to recover. If an input file is used, Exchange object save sets specified individually on the command line are ignored.
-p <i>temp_dir</i>	Specifies the path to the directory that stores temporary files.

Table 19. Recover Command Options (Part 2 of 2)

Option	Function
-q	Indicates quiet mode.
-r	Remounts the database.
-s <i>NetWorker_server_name</i>	Specifies the NetWorker server.
-t <i>browse_time</i>	Specifies the browse time.

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Appendix B: Messages

This appendix lists the NetWorker Module for Exchange Server error and informational messages. Suggestions are provided for resolving error conditions that might have generated each message.

This appendix includes the following sections:

- ["Microsoft Exchange Server Messages" on page 159](#)
- ["NetWorker Server Messages" on page 160](#)
- ["NetWorker Module Messages" on page 160](#)

Microsoft Exchange Server Messages

When the NetWorker Module encounters a Microsoft Exchange Server error or condition that produces a warning during a backup or recovery operation, a description of the error is written to the following logs:

- *nsrschsv.log*— Messages generated during backup
- *nsrxchrc.log* — Messages generated during recovery
- *lnmch_msexch.log* — Messages generated during database verification
- Windows Event Log — Microsoft Windows events

The NetWorker Module cannot correct errors caused by Microsoft Exchange Server. For information on resolving Microsoft Exchange Server errors, refer to the following Microsoft information sources:

- Microsoft Exchange Server documentation
- Knowledge Base
- Technical Support

NetWorker Server Messages

NetWorker server messages appear in the NetWorker Administrator program, which displays messages generated in the past 24 hours. For information about these messages, refer to the *NetWorker Error Message Guide*.

NetWorker Module Messages

Table 20 on page 160 lists messages that are specific to the NetWorker Module for Exchange Server software.

Table 20. NetWorker Module Error Messages (Part 1 of 8)

Message	Description
ADsOpenObject error <i>error_code</i> for <i>object_name</i>	An error occurred when the program attempted to bind to the Active Directory object. Check for communication problems with the Active Directory.
A full backup will be performed	A backup level other than full was specified, but cannot be performed. Verify that circular logging is not enabled. Also verify that a full backup is performed for all databases in a storage group before attempting an incremental or differential backup.
Backup_item failed for <i>item_url</i>	An error occurred while backing up the specified item.
Backup level converted from <i>n</i> to 1.	The backup program converts differential levels 2 through 9 to level 1.
Backup_pf failed for <i>folder</i>	An error occurred while performing a backup of the specified folder.
Backup_pf_tree failed for <i>pf_tree</i>	An error occurred while performing a backup of the specified folder tree.
Bad backup level	An invalid backup level was specified with the -l option.

Table 20. NetWorker Module Error Messages (Part 2 of 8)

Message	Description
Can't get name or virtual directory for PF tree <i>pf_tree</i>	The program cannot determine properties of the specified folder. Check for communication problems with the Active Directory.
Check spelling of PF tree name: <i>pf_tree</i>	The folder tree name may be spelled incorrectly on the command line.
Checking for marked PF tree items	The backup program is verifying that all marked items exist.
Cluster backup requires use of -c or -a (or both).	In the Microsoft cluster environment you must use the -a and/or -c options to identify the virtual server name and client index.
Cluster recover requires use of -c or -a (or both).	In the Microsoft cluster environment you must use the -a and/or -c options to identify the virtual server name and client index.
Connect_pub_folders failed for <i>url</i>	The recover program was unable to connect to the public folder tree.
Could not determine overwrite status for <i>sg_name/db_name</i>	The recover program could not determine if the specified database has been set to be overwritten by a restore.
Create_folder failed for <i>folder</i>	The recover program was unable to create a folder.
Created folder <i>folder_url</i>	The recover program created the specified folder.
Database <i>sg_name/db_name</i> cannot be overwritten by restore.	The specified database has not been set to be overwritten by a restore. A database cannot be restored unless this property is set.
Error binding to rootDSE: <i>error_code</i>	The program was unable to bind to the directory server. Check communication problems with Active Directory.
Error creating folder <i>folder_url</i> <i>error_text</i>	The recover program was unable to create the specified folder.

Table 20. NetWorker Module Error Messages (Part 3 of 8)

Message	Description
Error creating PerfMon update thread. <i>error_text</i>	The backup or recover program was unable to start the Performance Monitor update thread.
Error: <i>db_name</i> database not mounted	An attempt was made to back up a database that is not online. Mount the database and repeat the backup.
Error (<i>error_code</i>) getting database CN for <i>database</i>	The program was unable to get the database common name (CN) property. Check communication problems with the Active Directory.
Error (<i>error_code</i>) getting parent LDAP path for <i>database</i>	The program was unable to get a Lightweight Directory Access Protocol (LDAP) path from the Active Directory. Check communication problems with the Active Directory.
Error (<i>error_code</i>) getting storage group CN for <i>storage_group</i>	The program was unable to get the storage group CN property. Check communication problems with the Active Directory.
Error getting defaultNamingContext: <i>error_code</i>	The program was unable to get the <i>defaultNamingContext</i> from the Active Directory. Check communication problems with the Active Directory.
Error getting homeMDB for <i>mailbox</i>	The program was unable to identify which database contains the mailbox. Check communication problems with the Active Directory.
Error loading ESE dll. Status: <i>error_code</i>	An error occurred when the NetWorker Module attempted to load the Exchange backup .dll file.
Error on <i>get_server_dn</i> : <i>error_code</i> , <i>error_text</i>	The NetWorker Module was unable to obtain the server distinguished name from the Active Directory. This may be caused by a network connection problem with the domain controller.

Table 20. NetWorker Module Error Messages (Part 4 of 8)

Message	Description
Error opening file: <i>file_name</i>	The backup or recover program was unable to open the file specified with the -I option. Verify that the filename is spelled correctly and the file exists.
Error opening stream for: <i>item</i>	The program was unable to open the specified item.
Error parsing parameter: <i>param_string</i>	The format of the specified command line parameter is incorrect.
Exchange Server <i>server_name</i> was not found.	The NetWorker Module was unable to locate the specified Exchange server. Verify that the server name is spelled correctly.
ExOLEDB connection failed for <i>pf_tree</i>	The backup or recover program was unable to establish a connection to the specified public folder tree.
Folder <i>folder_url</i> does not exist. Attempting to re-create.	The public folder does not exist. The recover program is re-creating the folder.
Folder <i>name</i> is not replicated locally	The specified folder is not replicated to the local server.
Found all marked PF tree items.	All public folder items marked for backup exist.
Get_extra_properties failed to get <i>property</i> for class <i>object_class</i>	The backup program was unable to get the specified property for the object.
Internal system error, please see <i>nsr\applogs\xbasa.messages</i> on the client system for reason.	An error occurred between the backup or recover program and the NetWorker server (for example, the NetWorker server does not have the required enablers).
Invalid database: <i>sg_name/db_name</i>	An invalid database name was specified. Make sure the database exists on the Exchange server, and the name is spelled correctly.

Table 20. NetWorker Module Error Messages (Part 5 of 8)

Message	Description
Invalid storage group: <i>sg_name</i>	An invalid storage group name was specified. Make sure the storage group exists on the Exchange server, and the name is spelled correctly.
Invalid target storage group: <i>sg_name</i>	The specified storage group does not exist on the server. Make sure the storage group name is spelled correctly.
Invalid time specified: <i>time_string</i>	The format of the specified browse time is invalid.
Item not found: <i>item_name</i>	The specified item was marked for backup, but was not found in the public folder.
Log file gap detected. Max recovered log: <i>exxxxxxxxx.log</i>	A gap was detected between the highest sequence number of the recovered logs and the existing log files. The -e option will be used to specify the replay of only recovered logs.
<i>Mailbox_name</i> <service mailbox - no IPM data>	An attempt was made to back up a service mailbox that does not contain interpersonal message (IPM) data (e-mail messages). Only user mailboxes can be backed up.
MSEXCH:DS saveset is obsolete. Continuing...	MSEXCH:DS was specified as a target for the backup or recover program. MSEXCH:DS is obsolete for Exchange 2000. The backup or recover program will continue processing other valid targets.
No authority for backup operation	The account used to perform a backup is not a member of the Backup Operators group.
No authority for recover operation	The account used to perform a recovery is not a member of the Backup Operators group.
No backup found, cannot recover without backup	A recovery cannot be performed on an object that has not been backed up.
No backup target.	An Exchange object name was not specified for the backup program.

Table 20. NetWorker Module Error Messages (Part 6 of 8)

Message	Description
No databases are mounted.	The storage group specified for backup does not have any databases mounted. Mount the databases and repeat the backup.
No IPM data	A mailbox contains no e-mail messages.
No recovery target.	An Exchange object name was not specified for the recover program.
No Storage Group match for <i>sg_name</i>	An invalid storage group name was specified for the backup program. Make sure the name is spelled correctly and the storage group exists on the server. An attempt was made to recover a mailbox that was never backed up.
Not enough storage is available to process this command.	The NetWorker Module was unable to allocate memory. It may be necessary to reduce the number of programs that are currently running.
No virtual directory found for PF tree: <i>pf_tree</i>	The program was unable to determine the name of the folder tree virtual directory. Check communication problems with the Active Directory.
<i>object_name</i> backup not found. Continuing...	The recover program could not find a backup of the specified object. This could happen if all items in a folder were not backed up. The recovery continues.
Open Cluster error: <i>msg_string</i>	An error occurred when the NetWorker Module attempted to open a handle to the cluster.
Out of disk space backing up mailbox	The disk containing the temporary folder does not have enough free space to back up a mailbox. Use the temporary folder location (-p) to specify a directory with more available space.

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Table 20. NetWorker Module Error Messages (Part 7 of 8)

Message	Description
Previous <i>mailbox_item</i> backup not found	The recover program could not find a backup of the specified object. This could happen if all items in a folder were not backed up.
Previous <i>object_name</i> backup not found	An attempt was made to recover a storage group or database that was never backed up.
Record open failed for <i>record_url</i> . Error: <i>error_code</i>	The recover program was unable to re-create the specified item.
Record open failed for <i>record_url</i> . Error: <i>error_code</i>	The recover program is recovering items for the specified folder.
Recovering <i>folder_path</i> ...	A restore operation was attempted from the node that is not hosting the virtual server. Perform the restore on the same node that is currently hosting the virtual server.
Restore must be performed on virtual server active node.	Some public folder items marked for backup were not found.
Some marked PF tree items not found.	A backup is starting for the specified folder tree.
Starting backup of folder tree: <i>pf_tree</i>	Could not determine which physical node is currently hosting the virtual server.
Unable to determine active node for virtual server <i>server_name</i> : <i>error_text</i>	The NetWorker Module was unable to obtain the storage group distinguished name from the Active Directory. This may be caused by a network connection problem with the domain controller.
Unable to get DN for storage group <i>sg_name</i>	The NetWorker Module was unable to determine the path to the Exchange log files.

Table 20. NetWorker Module Error Messages (Part 8 of 8)

Message	Description
Unable to get log file path for storage group <i>sg_name</i>	The NetWorker Module was unable to locate the Exchange backup <i>API DLL</i> . This could occur if the Exchange System Management components are not installed.
Unable to locate folder tree virtual directory for <i>pf_tree</i>	The program was unable to identify the virtual directory for the folder tree. Check communication problems with the Active Directory.
Unknown host <i>host_name</i>	The virtual server name specified with the -a option does not exist. Check the spelling of the server name.

B

B

Glossary

This glossary contains definitions for terms used in this guide.

administrator	The person normally responsible for installing, configuring, and maintaining NetWorker software.
Administrators group	A Microsoft Windows user group whose members have all the rights and abilities of users in other groups, plus the ability to create and manage all the users and groups in the domain. Many NetWorker tasks can only be accomplished by members of the Administrators group.
API	Abbreviation for application programming interface. An agreed-upon set of computer library routines used to accomplish a task.
autochanger	A mechanism that uses a robotic arm to move media among various components located in a device, including slots, media drives, media access ports, and transports. Autochangers automate media loading and mounting functions during backup and recovery.
backup	The writing of saved data to a volume.
backup group	See <i>group</i> .
backup level	See <i>level</i> .

Backup Operators group	A Windows user group whose members have the capability to log onto a domain from a workstation or a server, back it up, and restore the data. Backup Operators also can shut down servers or workstations.
backup volume	See <i>volume</i> .
bootstrap	A save set that is essential for the NetWorker disaster recovery procedures. The bootstrap is composed of three components that reside on the NetWorker server: the media database, the resource database, and a server index.
BRC API	Abbreviation for Backup Recover Control application programming interface. The API through which the NetWorker Module communicates with the <i>BRC service</i> to perform snapshot operations.
BRC service	Abbreviation for Backup Recover Control service, the NetWorker PowerSnap service that provides snapshot backup and recover functionality to NetWorker application modules, such as the NetWorker Module for Exchange Server. See also <i>PowerSnap</i> .
brick-level	<p>A term used to describe mailbox and public folder backup operations. A brick-level operation backs up each individual mailbox or public folder.</p> <p>By default, mailbox items are recoverable at the folder level only, but users can elect to configure a mailbox backup so that items are recoverable at the item level. Public folder items are backed up and recovered at the item level only.</p>
browse policy	A policy that determines how long entries for backed up data remain in the NetWorker client file index.
browse time	A feature of the NetWorker User for Exchange Server program that allows you to select the date and time of the backup save sets that appear in the Recover or Snapshot Recover window, so you can restore data from previous backups. By default, the browse time is the current date and time.

client	See <i>NetWorker client</i> .
client file index	A database of information the NetWorker server maintains that tracks every database object, file, or <i>file system</i> backed up. The NetWorker server maintains a single client index file for each client computer.
clone	Process by which NetWorker software makes an exact copy of saved data (save sets). NetWorker software can clone individual save sets or the entire contents of a backup volume.
clone volume	Duplicated volume. NetWorker software can track four types of volumes: backup, archive, backup clone, and archive clone. Save sets of different types cannot be intermixed on one volume.
conventional backup	See <i>nonpersistent snapshot</i> .
device	A storage unit that reads from and writes to storage volumes. A storage unit can be a tape device, optical drive, <i>autochanger</i> , or file connected to the <i>NetWorker server</i> or <i>NetWorker storage node</i> .
directed recovery	A recovery method in which data that originated on one computer is recovered to a different computer.
directive	An instruction that directs NetWorker software to take special actions on a given set of files for a specified client during a backup.
domain controller	A computer that stores directory data and manages user interactions within a domain, including logon, authentication, directory searches, and access to shared resources.
enabler code	A special code that activates the software. The enabler code that unlocks the base features for software is called a base enabler. Enabler codes for additional features or products (for example, autochanger support) are called add-on enablers.

Exchange Backup API	The Microsoft Extensible Storage Engine (EXE) application programming interface, used by the NetWorker Module for performing traditional backup and restore of Microsoft Exchange Server databases.
Exchange object	See <i>Microsoft Exchange Server objects</i> .
expired save set	A save set that has exceeded its browse time and has been removed from the NetWorker <i>client file index</i> . Expired save sets can no longer be browsed.
failover	In a Microsoft cluster, the process of relocating a resource to its redundant or backup component, either because of a hardware or software failure, or for administrative purposes.
file index	See <i>client file index</i> .
file system	<ol style="list-style-type: none">1. A file tree located on a specific disk partition or other mount point.2. The entire set of all files.3. A method of storing files.
group	A NetWorker client or group of clients configured to start backups at a designated time.
IS	Abbreviation for Information Store. The Exchange server repository that includes the private store and public store. The public store holds all public folder hierarchies and public folder replicas. The private store holds all private folders and associated information, such as individual mailbox messages and attachments.
Information Store databases	The public database and private database that hold the information in the public folders and private mailboxes.
instant backup	The process of creating a point-in-time copy (<i>snapshot</i>) of data and saving it on <i>primary storage</i> . The NetWorker Module supports instant backup of one or more Exchange storage groups.

instant restore	The process of copying data created during an <i>instant backup</i> back to its original location on the Exchange server during a recover operation. The NetWorker Module supports instant restore of one or more Exchange storage groups or databases.
KMS	Abbreviation for Key Management Server. A Microsoft Exchange 2000 Server component that may be installed on a designated server in an administrative group. KMS provides centralized administration and archival of private keys, and maintains every user's private encryption key in an encrypted database. The keys are used for encrypting e-mail messages and signing messages with digital signatures. There can be one Key Management server per administrative group.
level	<p>A backup configuration option that specifies how much Exchange data is saved during the backup, and determines whether committed transaction logs are truncated after the backup. The Microsoft Exchange level options are:</p> <p>Full — Backs up databases and transaction logs, and truncates committed logs.</p> <p>Copy — Backs up databases and transaction logs, but does not truncate committed logs.</p> <p>Incremental — Backs up transaction logs created since the last backup, and truncates committed logs.</p> <p>Differential — Backs up transaction logs created since the last full or incremental backup, but does not truncate committed logs.</p> <p>Note: The NetWorker Module uses different backup levels than the NetWorker software.</p>
license enabler	See <i>enabler code</i> .
log files	See <i>transaction log files</i> .
mailbox database	The part of the <i>IS</i> that maintains information in user mailboxes. A mailbox database consists of a rich text <i>.edb</i> file, a streaming native Internet content <i>.stm</i> file, and associated transaction log files.

manual backup	An unscheduled backup of Exchange data, performed either with the NetWorker User for Exchange Server program, or by running nsrxchsv at the command prompt.
media database	A database that contains indexed entries about the storage volume location and the life cycle status of all data and volumes the NetWorker server manages.
media index	See media database .
media manager	The NetWorker component that tracks save sets to backup volumes. The nsrmmdbd service is responsible for making entries in the NetWorker online media database.
media volume	See volume .
MSCS	Abbreviation for Microsoft Cluster Server. A Microsoft Windows server feature that supports the connection of multiple servers into a “cluster” for higher availability of data and applications.
Microsoft Exchange Client	The program that a client uses to read, write, and manipulate the post office and folders.
Microsoft Exchange Server objects	Any Microsoft Exchange Server data that can be backed up or recovered as a single entity. This includes the <i>IS</i> , any storage group, database, mailbox, private folder, or individual item in a mailbox or public folder.
MAPI	Abbreviation for Microsoft Messaging API. Set for messaging applications that is widely supported by messaging vendors, primarily attributable to Microsoft.
mount	To make a database available for use or to place a removable tape or disk into a drive.

Multiple Information Stores and Storage Groups	<p>Exchange supports multiple databases contained within a storage group. A storage group includes one to five databases and one set of transaction log files for all databases in the storage group. You can create a maximum of four storage groups on one server.</p> <p>If each storage group contains the maximum of five databases, you can create a maximum of 20 databases on one server.</p>
multiplex	Method of transmitting multiple streams of data simultaneously through the same channel.
NetWorker Administrator program	The user interface that NetWorker administrators use to configure NetWorker server attributes, and perform other administrative tasks on the NetWorker server.
NetWorker Application Module	A software module that interfaces with the native functionality of a database, messaging, or ERP application to perform high-integrity backups online and recover data at a granular level, such as tablespace or datafiles.
NetWorker client	A computer that has the NetWorker client software installed and can access the backup and recovery services from a NetWorker server. A client may be a workstation, a fileserver, or the host computer for a NetWorker Application Module .
NetWorker resource	A component of NetWorker software that controls the functionality of the NetWorker server and its clients. Examples of NetWorker resources include devices, schedules, clients, groups, and policies. Each resource consists of a list of attributes that define the resource's specific parameters.
NetWorker server	Computer on a network running the NetWorker software, containing the online indexes, and providing backup and recovery services to the clients on the same network.
NetWorker storage node	A storage device physically attached to another computer whose backup operations are administered from the controlling NetWorker server.

NetWorker User for Exchange Server	The graphical user interface for the NetWorker Module for Microsoft Exchange Server software from which traditional manual backups and recovery operations are performed.
nonpersistent snapshot	A snapshot backup that is moved to secondary storage on the NetWorker server or storage node and is no longer available for instant restore from the Exchange on the Exchange server's storage subsystem.
nsrhost	Logical hostname of the computer that is the NetWorker server.
nsrxchr	The NetWorker Module for Exchange Server recover command.
nsrxchsv	The NetWorker Module for Exchange Server backup command.
object	See <i>Microsoft Exchange Server objects</i> .
OST	Abbreviation for offline message store. The message store (typically on a user's hard disk) that stores messages locally and allows for replication of information between the client and the server.
online client indexes	The NetWorker <i>client file index</i> and <i>media database</i> . The databases on a NetWorker server that contain information pertaining to client backups and backup volumes.
OTF	Abbreviation for open tape format. A format that allows the same tape to be shared among different operating systems and platforms.
point-in-time (PiT) copy	See <i>snapshot</i> .
policy	A NetWorker server resource that specifies how long an entry can remain in a <i>client file index</i> . When a policy expires, the save sets associated with that policy are marked recyclable.

pool	A NetWorker server resource that enables you to sort backup data to selected volumes. A volume pool contains a collection of backup volumes to which specific data has been backed up.
PowerSnap	The family of products that activate and manage storage snapshot support, without depending on applications or databases executed on a host system.
PowerSnap Module	A software module that exports services of a storage subsystem by interfacing with vendor specific APIs. This module is independent of applications and backup and recovery interfaces.
primary storage	An Exchange server storage subsystem that contains Exchange data and any persistent snapshot backups of the data. See also secondary storage .
properties	Attributes of an object, such as the display name of a recipient.
proxy client	A surrogate client that performs the NetWorker save operation for the client that requested the backup.
.pst file	The filename extension of a file the Exchange Server creates to store individual mailbox items (such as e-mail messages). The <i>.pst</i> files typically reside on the workstation of the user who owns the mailbox.
public folder database	The part of the Exchange server IS that maintains information in public folders. A public folder database consists of a rich text <i>.edb</i> file, plus a streaming native Internet content <i>.stm</i> file.
recover	The NetWorker command used to browse the server index and recover files from a backup volume to a client's disk. See also nsrxchrc .
recycle	A volume whose data has passed both its browse and retention policies and is available for relabeling and reuse.

registry	Database of configuration information central to Windows operations. The overall effect centralizes all Windows NT settings and provides control over system, security, and user account settings.
resource	See <i>NetWorker resource</i> .
retention policy	Policy that determines how long to retain entries in the media database for recovery.
save	The NetWorker command that backs up client files to backup volumes and makes data entries in the online index. See also <i>nsrxchsv</i> .
save set	A group of files or a file system from a single NetWorker client backed up to storage media.
save set ID	An internal identification number that NetWorker software assigns to a save set.
scheduled backup	A type of backup that is configured to start automatically at a specified time for a group of one or more NetWorker clients. Scheduled backups are configured by using either the NetWorker Configuration Wizard, or the NetWorker Administrator program on the NetWorker server.
secondary storage	A storage library on the NetWorker server or storage node, used for storage of traditional or snapshot backups. A NetWorker server Device resource must be configured for each secondary storage device. See also <i>primary storage</i> .
serverless backup	A backup method that employs a <i>proxy client</i> to move the data from primary storage on the application server host computer to secondary storage.

SRS	Abbreviation for Site Replication Service. A directory service (similar to the directory used in Exchange Server 5.5) implemented in Exchange 2000 to allow the integration with downstream Exchange 5.x sites by using both remote procedure call (RPC) and mail-based replication. SRS works in conjunction with Active Directory Connector to provide replication services from the Active Directory to the Exchange 5.x Directory Service.
snap set	The group of Exchange objects for which a snapshot is created on a primary storage subsystem.
snapshot	A point-in-time copy of Exchange data created on a supported type of <i>primary storage</i> subsystem during an instant backup.
snapshot expiration policy	The policy that determines how long point-in-time copies are retained before they are used for creating a different PIT copy.
snapshot policy	A NetWorker server Snapshot Policy resource controls the lifecycle of snapshot backups. The snapshot policy specifies the frequency of snapshot backups, and how long snapshots are retained before being recycled.
snapshot retention policy	The policy that determines how many point-in-time copies are retained in the media database and thus are recoverable.
ssid	See <i>save set ID</i> .
stand-alone device	Backup device that contains a single drive for backing up data. Stand-alone devices cannot store or automatically load backup volumes.
storage group	A collection of mailbox stores and public folder stores that share a set of transaction log files. Exchange manages each storage group with a separate server process.

storage manager	Application that manages the storage devices and media used for backup and restore requests. The NetWorker Module is a storage manager that connects NetWorker services to the Microsoft Exchange Server to provide storage management for databases and transaction logs.
storage node	A storage device physically attached to a computer other than the NetWorker server, whose backup operations are administered from the controlling NetWorker server.
traditional backup	A NetWorker Module for Exchange Server backup that uses the <i>Exchange Backup API</i> (as opposed to a snapshot backup, which uses the <i>BRC API</i>). These operations are referred to as “traditional” because this method has been in use since the NetWorker Module was first released.
traditional recovery	A NetWorker Module for Exchange Server recovery that use the <i>Exchange Backup API</i> (as opposed to a snapshot recovery, which uses the <i>BRC API</i>). These operations are referred to as “traditional” because this method has been in use since the NetWorker Module was first released.
transaction log files	The log files for a storage group, which contain the database transactions for all mailbox stores or public folder stores in the group.
truncation	A Microsoft Exchange Server operation that deletes an Exchange transaction log file.
volume	A unit of storage media, such as a magnetic tape, an optical disk, or a file. A storage device reads from and writes to volumes, which can be physical units (for example, a labeled tape cartridge) or logical units (for example, optical media can store multiple volumes on a single physical platter).

volume ID	Internal identification the NetWorker software assigns to a backup volume. The volume ID is entered in the NetWorker server's media database for volume policy management.
volume name	Name you assign to a backup volume when it is labeled internally by NetWorker.
volume pool	See <i>pool</i> .
XBSA	Acronym for X/Open Backup Services Application Programming Interface, which connects NetWorker functionality to NetWorker Module.

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X

XBSA
 NetWorker
 (See also NetWorker XBSA)

